Tivoli Storage Manager for NetWare Backup-Archive Client Installation and User's Guide

Version 5 Release 1

GC32-0786-00

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Note
Before using this information and the product it supports, read the general information under "Notices" on page 243.

First Edition (March 2002)

This edition applies to version 5, release 1, modification 0 of Tivoli Storage Manager (5697-ISM, 5698-ISM), Tivoli Storage Manager, Enterprise Edition (5697-ISE, 5698-ISE) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

Tables vii

Trademarks ix

About This Book. xi
Conventions Used in This Book xi
Reading Syntax Diagrams xii
Related Publications xv

Summary of Changes for Tivoli Storage Manager xvii
Technical Changes for Version 5.1 - April 2002 . . xvii

Chapter 1. Installing IBM Tivoli Storage Manager 1
Migrating from Earlier Versions 1
Upgrade Path for Clients and Servers 1
Changes to Client-Server Communications . . . 1
Additional Migration Information 2
NetWare Client Environment 2
Client Components 2
Hardware Requirements 2
Software Requirements 2
Communications Methods 2
SMS Software Requirements 2
Installing the Client Program (Required) 3
Installing from CD-ROM 3
Tivoli Storage Manager Server Installation and Configuration 3

Chapter 2. Configuring IBM Tivoli Storage Manager 5
Updating AUTOEXEC.NCF (Required) 5
Creating and Modifying the Client Options File (Required) 5
Setting Options in the Client Options File. . . . 6
Registering Your Workstation with a Server (Required) 7
Using Closed Registration 7
Using Open Registration 7
Creating an Include-Exclude List (Optional) 8
Using Include-Exclude Options 8
Processing Include and Exclude Options. . . . 12
Accessing Remote NetWare Servers 15

Chapter 3. Getting Started 17
Tivoli Storage Manager Client Authentication . . . 17
Starting a Session 18
Using Batch Mode 18
Using Interactive Mode 19
Starting a Web Client Session 20
Setting User Privileges. 22
Installing and Using the Web Client 22
Accessing the NetWare Server 24
Sorting File Lists. 24
Displaying Online Help 25
Ending a Session 25
Online Forum 25
Other Sources of Online Help 25
Contacting Customer Support 25

Chapter 4. Backing Up Your Data . . . 27
A Checklist to Help Plan Your Backups 27
Encryption 27
Do You Want to Back Up or Archive Files? 28
Backing Up Files and Directories 28
Understanding Which Files are Backed Up . . . 29
Full Incremental Backup 29
Incremental-By-Date Backup. 31
Full Incremental versus Partial Incremental, Incremental-by-date Backups 31
Selective Backup. 31
Support for Long Names 32
Running an Incremental Backup on a Memory-Constrained Machine 35
Using the Include-Exclude List to Control Processing 35
Performing Command Line Backups 35
Using the Web Client to Back Up Data 37
Backing Up Open Files 38
Requesting Backup and Archive Services for Remote Servers 39
Backing Up Files: Additional Topics 40
Understanding How Files Are Managed 40
Understanding Which Files Are Backed Up. . . 40

Chapter 5. Restoring Your Data 41
No Query Restore 41
Standard Restore Process 42
No Query Restore Process 42
Performing a Command Line Restore. 42
Do You Want To Restore an Active or Inactive Backup? 42
Performing Large Restore Operations. 43
Performing a Point-in-Time Restore 44
Using the Web Client to Restore Files. 45
Restoring Data from a Backup Set 46
Restoring an Entire or Partial Backup Set . . . 46
Restoring Files: Additional Topics 46
Authorizing Another Client Node to Restore or Retrieve Your Files 47
Restoring or Retrieving Files from Another Client Node 47
Restoring or Retrieving Your Files to Another Client Node 47
Restoring a Disk In Case of Disk Loss 48
Deleting File Spaces 48

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Chapter 6. Archiving and Retrieving Files 49
Understanding How Your Archives Are Managed 49
Performing Command Line Backups 49
Using the V2 Archive Option 50
Using the Web Client to Archive Data 50
Considerations 51
Archiving Files: Advanced Considerations 51
Deleting Archived Files 51
Requesting Archive Services for Remote Servers 51
Performing Command Line Retrieves. 51
Using the Web Client to Retrieve Data 52

Chapter 7. Automating Tasks 53
Specifying Scheduling Options 53
Return Codes from the Command Line Interface . . 53
Managing the Client Scheduler Using the Client Acceptor Daemon (Recommended Method) . . . 55
Configuring the CAD to Manage the Scheduler 55
Starting the Client Scheduler 55
Displaying Information about Scheduled Work . . 55
Displaying Information about Completed Work . . 56
Enabling-Disabling Scheduled Commands 57

Chapter 8. Understanding Storage Management Policies 59
Using Policy Domains and Policy Sets 59
Using Management Classes and Copy Groups. . . 59
Displaying Information about Management Classes and Copy Groups 60
Copy Group Name 61
Copy Type. 61
Copy Frequency 61
Versions Data Exists 61
Versions Data Deleted 62
Retain Extra Versions 62
Retain Only Version 62
Copy Serialization 62
Copy Mode 63
Copy Destination 63
Retain Versions 63
Selecting a Management Class for Files 63
Assigning a Management Class to Files 64
Overriding the Management Class for Archived Files 65
Selecting a Management Class for the NDS. . . . 65
Selecting a Management Class for Directories . . . 65
Binding and Rebinding Management Classes to Files 66
Rebinding Backup Versions of Files 66
Using a Retention Grace Period. 67

Chapter 9. Using Processing Options 69
Overview of Processing Options 69
Communication Options 69
TCP/IP Options 70
Node Option 70
Backup and Archive Processing Options. 70
Restore and Retrieve Processing Options 72
Scheduling Options. 72
Format and Language Options 73
Command Processing Options 73
Authorization Options. 74
Error Processing Options 74
Transaction Processing Options. 75
Web Client Options. 75
Using Options with Commands 75
Entering Options with a Command 76
Client Options Reference 77
Changingretries 78
Commmethod 79
Commrestartduration 80
Commrestartinterval 81
Compressalways. 82
Compression 83
Dateformat 85
Dirmc 86
Domain. 87
Editor 89
Encryptkey 90
Errorlogname. 91
Errorlogretention 92
Exclude Options. 93
Httpport 96
Inclexcl 97
Include Options 98
Language. 100
Largecommbuffers. 101
Managedservices 102
Maxcmdretries 104
Memoryefficientbackup 105
Nodename 106
Numberformat 107
Nwignorecompressbit 108
Nwpwfile 109
Nwuser 110
Nwwaitonerror 112
Password 113
Passwordaccess. 114
Passworddir 116
Postschedulecmd 117
Preschedulecmd 118
Processorutilization 119
Queryschedperiod. 120
Quiet 121
Replace 122
Resourceutilization 123
Retryperiod 125
Revokeremoteaccess 126
Schedcmddisabled. 127
Schedlogname 128
Schedlogretention 129
Schedmode 130
Scrolllines 132
Scrollprompt 133
Subdir. 134
Tapeprompt 136
Tcpbuffsize 137
Tcpclientaddress 138
Tcpclientport 139
Tcpport 140
Tcpserveraddress 141

Tcpwindowsize 142
Timeformat 143
Txnbytelimit 144
Verbose 145
Virtualnodename 146
Webports 147

Chapter 10. Using Options with Commands 149
Entering Options with a Command 149
Command Line Options Reference 152
Archmc 153
Deletefiles 154
Description 155
Detail 156
Dirsonly 157
Filelist 158
Filesonly 160
Fromdate 161
Fromnode 162
Fromtime 163
Ifnewer 164
Inactive 165
Incrbydate 166
Latest 167
Location 168
Noprompt 169
Optfile 170
Pick 171
Pitdate 172
Pittime 173
Preservepath 174
Todate 177
Totime 178
V2archive 179
Volinformation 180

Chapter 11. Using Commands 181
Starting and Ending a Client Command Session 182
Process Commands in Batch Mode 182
Process Commands in Interactive Mode . . . 183
Entering Client Commands 183
Command Name 183
Options 183
Parameters 184
File Specification Syntax 184
Maximum File Size for Operations 185
Remembering Previous Commands 185
Using Wildcard Characters 186
Entering Commands 186
Client Commands Reference 186
Archive 187
Cancel Restore 188
Delete Access 189
Delete Archive 190
Delete Filespace 191
Expire 192
Help 193
Incremental 194
Loop 198
Macro 199
Query Access 200
Query Archive 201
Query Backup 202
Query Backupset 203
Query Filespace 204
Query Inclexcl 205
Query Mgmtclass 206
Query Restore 207
Query Schedule 208
Query Session 209
Query TSA 210
Restart Restore 213
Restore 214
Restore Backupset 216
Retrieve 218
Schedule 220
Selective 221
Set Access 223
Set Password 225

Tivoli Storage Manager NetWare Backup and Recovery Guide 227
NDS Backup Considerations 227
Storage Management Services 227
Tivoli Storage Manager and NDS 228
Naming Conventions for NDS Objects 228
NDS Backup Using Tivoli Storage Manager . . 228
Specifying the Entire NDS for Backup 228
Specifying NDS Objects for Backup, Restore and Queries 229
Include-Exclude Processing 229
User Rights Required to Backup or Restore NDS 230
Conventions for Logging into a NetWare Server 230
Schema Backup or Restore 230
Server Specific Information 231
NDS Specific Backup Issues 232
Partitions 232
Replicas 232
Schema 232
Object References 233
Server Centric IDs 233
Server References 234
Current Backup Limitations 234
Backup Recommendations 234
Testing Considerations 234
NDS Restore Considerations 235
Example 1: Loss of a Non-SYS Volume 235
Example 2: Loss of a SYS Volume or Entire Server 236
Example 2a: Single-Server Network 236
Example 2b: Multiple-Server Network (replica present) 237
Example 2c Multiple-Server Network (Replica not present) 238
Example 3: Loss of an Entire NDS Tree 240
Print Queues 240

Notices 243

Glossary . . . . . **245** **Index** **253**

Tables

1. Typographical Conventions xi
2. Tivoli Storage Manager Client Publications xv
3. Tivoli Storage Manager Server Quick Start Publications 3
4. Option for Excluding Directories 9
5. Options for Controlling Backup and Archive Processing 9
6. Options for Controlling Compression and Encryption Processing 10
7. Wildcard and Other Special Characters 10
8. Using Wildcard Characters with Include and Exclude Patterns 12
9. Backing Up Your Data 27
10. Preliminary Steps for Backing Up Files 27
11. Restoring Your Data. 41
12. Archiving and Retrieving Files 49
13. Return Codes and Meanings 54
14. Default Values in the Standard Management Class 61
15. TCP/IP Options 70
16. Node Options 70
17. Backup and Archive Processing Options 70
18. Restore and Retrieve Processing Options 72
19. Scheduling Options 72
20. Format and Language Options 73
21. Command Processing Options 73
22. Authorization Options 74
23. Error Processing Options 74
24. Transaction Processing Options 75
25. Web Client Options 75
26. Client Command Options 149
27. Entering Commands 181
28. Commands 181
29. Command Recall and Edit Functions 185
30. Wildcard Characters 186

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About This Book

IBM Tivoli Storage Manager is a client-server licensed product that provides storage management services in a multi-platform computer environment. The backup-archive client program permits users to back up and archive files from their workstations or file servers to storage, and restore and retrieve backup versions and archived copies of files to their local file systems.

In addition to the backup-archive client, Tivoli Storage Manager includes the following components available on a variety of platforms:

- A *server program* that permits systems to perform as a backup and archive server for distributed workstations and file servers.
- An *administrative client program* that you can access from a Web browser or the command line. The program permits an administrator to control and monitor server activities, define storage management policies for backup, archive and space management services, and set up schedules to perform those services at regular intervals.
- An *application program interface (API)* that permits you to enhance an existing application with storage management services. When an application is registered with a server as a client node, the application can back up, restore, archive, and retrieve objects from storage.
- A *Web backup-archive client* that permits an authorized administrator, help desk person, or end user to perform backup, restore, archive, and retrieve services using a Web browser on a remote machine.

This book explains how to install the Tivoli Storage Manager clients and how to perform initial setup tasks. For information about installation and levels of operating systems that are supported, refer to the installation chapter for your client. For information about environment variables, refer to the environment variables section for your client.

This book provides information to help you set up and use the backup-archive client on your workstation. You should be familiar with your workstation, your operating system, and your basic system administration.

Tivoli Storage Manager books are translated into other languages. Contact your Tivoli Storage Manager representative for a list of available translations.

Conventions Used in This Book

This book uses the following typographical conventions:

Table 1. Typographical Conventions

Example	Description
`dsmc.nlm`	A series of lowercase letters with an extension indicates Tivoli Storage Manager program file names.
archive	Boldface type indicates a command that you type at a workstation, such as a command you type on a command line.

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Table 1. Typographical Conventions (continued)

Example	Description
dateformat	Boldface italic type indicates a Tivoli Storage Manager option. The bold type is used to introduce the option, or used in an example. All other times in the text it appears as regular type. Occasionally, file names are entered in boldface italic for emphasis.
filespec	Italicized type indicates either the name of a parameter, a new term, or a placeholder for information that you provide. Italics are also used for emphasis in the text.
`maxcmdretries`	Monospaced type represents fragments of a program or information as it would display on a screen.
plus sign (+)	A plus sign between two keys indicates you should press both keys at the same time.

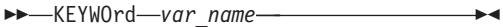
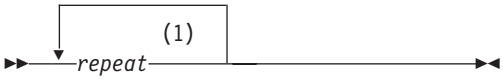
Reading Syntax Diagrams

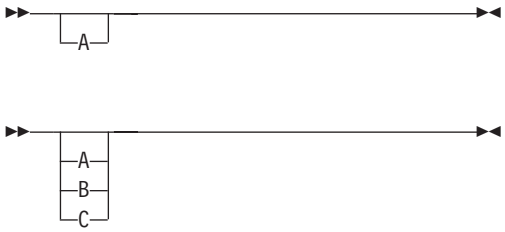
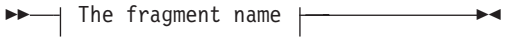
This section describes how to read the syntax diagrams used in this manual. To read a syntax diagram, follow the path of the line. Read from left to right, and top to bottom.

- The ►►— symbol indicates the beginning of a syntax diagram.
- The —► symbol at the end of a line indicates the syntax diagram continues on the next line.
- The ►— symbol at the beginning of a line indicates a syntax diagram continues from the previous line.
- The —►◄ symbol indicates the end of a syntax diagram.

Syntax items, such as a keyword or variable, can be:
- On the line (required element)
- Above the line (default element)
- Below the line (optional element).

Syntax Diagram Description	Example
Abbreviations: Uppercase letters denote the shortest acceptable truncation. If an item appears entirely in uppercase letters, it cannot be truncated. You can type the item in any combination of uppercase or lowercase letters. In this example, you can enter KEYWO, KEYWORD, or KEYWOrd.	►►—KEYWOrd———————————————————►◄

Syntax Diagram Description	Example
Symbols: Enter these symbols exactly as they appear in the syntax diagram.	* Asterisk { } Braces : Colon , Comma = Equal Sign - Hyphen () Parentheses . Period Space
Variables: Italicized lowercase items (*var_name*) denote variables. In this example, you can specify a *var_name* when you enter the KEYWORD command.	
Repetition: An arrow returning to the left means you can repeat the item. A character or space within the arrow means you must separate repeated items with that character or space. A footnote by the arrow references the number of times you can repeat the item.	  **Notes:** 1 Specify *repeat* as many as 5 times.
Required Choices: When two or more items are in a stack and one of them is on the line, you *must* specify one item. In this example, you *must* choose A, B, or C.	

Syntax Diagram Description	Example
Optional Choice: When an item is below the line, that item is optional. In the first example, you can choose A or nothing at all. When two or more items are in a stack below the line, all of them are optional. In the second example, you can choose A, B, C, or nothing at all.	
Defaults: Defaults are above the line. The default is selected unless you override it. You can override the default by including an option from the stack below the line. In this example, A is the default. You can override A by choosing B or C. You can also specify the default explicitly.	
Repeatable Choices: A stack of items followed by an arrow returning to the left means you can select more than one item or, in some cases, repeat a single item. In this example, you can choose any combination of A, B, or C.	
Syntax Fragments: Some diagrams, because of their length, must fragment the syntax. The fragment name appears between vertical bars in the diagram. The expanded fragment appears between vertical bars in the diagram after a heading with the same fragment name.	 **The fragment name:**

Related Publications

Included here is a list of the publications that are referred to in this manual.

Table 2. Tivoli Storage Manager Client Publications

Publication Title	Order Number
Tivoli Storage Manager Messages	GC32-0767
Tivoli Storage Manager for Windows Backup-Archive Clients Installation and User's Guide	GC32-0788
Tivoli Storage Manager for UNIX Backup-Archive Clients Installation and User's Guide	GC32-0789
Tivoli Storage Manager for Macintosh Backup-Archive Client Installation and User's Guide	GC32-0787
Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients	GC32-0794
Tivoli Storage Manager Using the Application Programming Interface	GC32-0793
Tivoli Storage Manager for AIX Quick Start	GC32-0770
Tivoli Storage Manager for HP-UX Quick Start	GC32-0774
Tivoli Storage Manager for OS/390 and z/OS Quick Start	GC32-0777
Tivoli Storage Manager for Sun Solaris Quick Start	GC32-0780
Tivoli Storage Manager for Windows Quick Start	GC32-0784

The Tivoli Storage Manager publications are available on the following CD-ROM:

Tivoli Storage Manager Publications Version 5.1, SK3T-8176

Tivoli Storage Manager publications are available in softcopy at the following Web page:

`http://www.tivoli.com/support/public/Prodman/public_manuals/td/TD_PROD_LIST.html`

The IBM International Technical Support Center redbooks are available in softcopy on the IBM Redbooks Web site at the following Web page:

`http://www.redbooks.ibm.com`

You can order hardcopies of all our publications from the IBM Direct Publications Catalog Web site at the following Web page:

`http://www.elink.ibmlink.ibm.com/pbl/pbl`

Summary of Changes for Tivoli Storage Manager

This section summarizes changes made to the Tivoli Storage Manager product and this publication.

Technical Changes for Version 5.1 - April 2002

Following is a summary of changes since Tivoli Storage Manager Version 4.2:

Enhanced Web Client Interface
The Web client interface is enhanced to support a JRE 1.3.1 Swing-enabled browser. The Web client facilitates the use of assistive devices for users with disabilities and contains improved keyboard navigation.

Support for Long File Names for Backup Sets
Tivoli Storage Manager supports the use of long file names for backup sets on the NetWare client. See "Location" on page 168 for more information.

Support for Long File Name Conversions
Tivoli Storage Manager supports long file name conversions without being affected by the ***memoryefficientbackup*** option. See "Support for Long Names" on page 32 for more information.

Support for files greater than 4 GB on Novell Storage Services (NSS) Volumes
Tivoli Storage Manager supports files larger than 4 GB for NSS file spaces on NetWare 5.1 and NetWare 6. See "Maximum File Size for Operations" on page 185 for more information.

Multiple Session No Query Restore
The backup-archive clients can now utilize multiple restore sessions for no query restore operations, increasing the speed of restores. This is similar to the multiple backup session support. It exploits the mount point available on the server. If data is backed up on multiple tapes, and if the server has multiple mount points available, then the restore starts a session for each tape, up to the number your administrator configures. See "Resourceutilization" on page 123 for more information.

Consistent Client Return Codes
Reliable, consistent, and documented return codes have been added to the command line client and the scheduler. This facilitates automation of client operations via user-written scripts. By using the **QUERY EVENT** command with the ***FORMAT***=*DETAILED* option, administrators can now distinguish between scheduled backups that completed successfully with no skipped files and scheduled backups that completed successfully with one or more skipped files. Also if you use the processing option**preschedulecmd** to run a command, and that command returns a non-zero return code, the scheduled event will not run. This ensures that scheduled events will not run if prerequisite commands do not complete successfully. See "Return Codes from the Command Line Interface" on page 53, "Preschedulecmd" on page 118, and "Postschedulecmd" on page 117 for more information.

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Chapter 1. Installing IBM Tivoli Storage Manager

The IBM Tivoli Storage Manager backup-archive client helps you protect information on your NetWare server. *As a NetWare server administrator, supervisor, or user with administrator or supervisor equivalence*, you can maintain backup versions of your NetWare server files that you can restore if the original files are damaged or lost. You can also archive NetWare server files that you do not currently need, or preserve them in their current state, and retrieve them when necessary.

You can access IBM Tivoli Storage Manager backup and archive features:
- Locally through the native client command line interface
- Remotely or locally through the Web client interface

This chapter provides migration, environment, and installation information for the Tivoli Storage Manager client. After installation, see Chapter 2, "Configuring IBM Tivoli Storage Manager" on page 5 for required configuration tasks to perform before using Tivoli Storage Manager.

Migrating from Earlier Versions

Upgrade Path for Clients and Servers

As part of a migration plan from Tivoli Storage Manager Version 4.2 to Tivoli Storage Manager Version 5.1, Tivoli Storage Manager clients and servers may be upgraded at different times. To help ensure that you can continue your backup and archive activities during the migration, note the following:

- A Tivoli Storage Manager V4.2 client can perform backup, restore, archive, and retrieve functions to a Tivoli Storage Manager V5.1 server.
- A Tivoli Storage Manager V5.1 client can perform backup, restore, archive, retrieve, and query functions to a Tivoli Storage Manager 4.2 server.
- Data that has been backed up or archived from a Tivoli Storage Manager V5.1 client to any Tivoli Storage Manager server cannot be restored or retrieved using a Tivoli Storage Manager V4.2.1 or lower level client.

Changes to Client-Server Communications

Tivoli Storage Manager NetWare client no longer supports the IPX/SPX and SNA LU6.2 (APPC) communication methods. Therefore, the NetWare client no longer supports the following options:
- ***ipxbuffersize***
- ***ipxserveraddress***
- ***ipxsocket***
- ***cpipbuffersize***
- ***cpicmodename***
- ***partnerluname***
- ***symbolicdestination***
- ***tpname***

TCP/IP is the replacement communication method for former IPX/SPX and SNA LU6.2 (APPC) users of the NetWare client. For more information about the TCP/IP communication method, see "Communication Options" on page 69.

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Additional Migration Information

When you install the Web client, you must install the backup-archive client for the language you want to use.

NetWare Client Environment

This section contains client environment information, IBM Tivoli Storage Manager client components, and hardware and software requirements for the NetWare platform.

Attention

For current information concerning the client environment prerequisites for all Tivoli Storage Manager supported client platforms refer to the README file that is shipped on the product installation media.

Client Components

- Backup-archive client (command-line)
- Tivoli Storage Manager API
- Web backup-archive client

Hardware Requirements

- A personal computer or workstation running as a NetWare file server
- Disk space: see the README file that is shipped on the product installation media
- Memory: approximately 1 MB of RAM is needed for each 8,000 files per volume

Software Requirements

- Novell NetWare 5.1 or Novell NetWare 6. See the README file that is shipped on the product installation media for information on supported patches from Novell.

Communications Methods

To use this communication method:	Install this software on file server::	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with Novell NetWare)	AIX, HP-UX, OS/390, Solaris, VM, Windows NT, z/OS

SMS Software Requirements

For current information on supported Storage Management Services (SMS) modules available from Novell, refer to the README file that is shipped on the product installation media.

Notes:

1. If you want to execute remote backups, SMDR.NLM must be loaded on the source and target servers, and the TSA modules must be loaded on the target server.
2. Only NetWare 5.1 and 6.0 are supported for remote backup.

Installing the Client Program (Required)

The Tivoli Storage Manager NetWare client is included on the desktop client installation CD-ROM in the `tsmcli/ntw` directory structure. However, you must have **Create** access to the directory where Tivoli Storage Manager components are installed.

You can display online startup information, product manuals, and readmes. On a Web browser:

1. Click **File** and then click **Open File**.
2. Select the CD-ROM drive.
3. Select the **START.HTM** file.

Installing from CD-ROM

1. Mount the client CD-ROM.
2. Load the NetWare Server Installation routine NWconfig.NLM for NetWare 5.1 and 6.0. You can use RCONSOLE.
3. Select **Product Options** and press Enter.
4. Select **Install a product not listed** and press Enter.
5. Press F3 to specify `{Volume}:\TSMCLI\NTW`, where `{Volume}` is the volume name of the mounted CD-ROM.
6. Select the components you wish to install. Follow the instructions on the screen.
7. Press F10 to start the installation.

Notes:

1. If you attempt to use NWconfig.NLM to *remove* the components, product records are deleted from the database. Product files *are not* deleted. To delete the product files, use the NetWare Administrator utility or the PURGE command line utility.

Tivoli Storage Manager Server Installation and Configuration

The Tivoli Storage Manager clients work in conjunction with the Tivoli Storage Manager server. Contact your Tivoli Storage Manager administrator to obtain client access to the Tivoli Storage Manager server, or refer to the following publications to install and configure a Tivoli Storage Manager server:

Table 3. Tivoli Storage Manager Server Quick Start Publications

Publication Title	Order Number
Tivoli Storage Manager for AIX Quick Start	GC32-0770
Tivoli Storage Manager for HP-UX Quick Start	GC32-0774
Tivoli Storage Manager for OS/390 and z/OS Quick Start	GC32-0777
Tivoli Storage Manager for Sun Solaris Quick Start	GC32-0780
Tivoli Storage Manager for Windows Quick Start	GC32-0784

Chapter 2. Configuring IBM Tivoli Storage Manager

Attention

For current configuration information for the IBM Tivoli Storage Manager program product, refer to the README file that is shipped on the product installation media.

After installation, *required* configuration tasks include the following:

Task	Page
Updating AUTOEXEC.NCF (Required)	5
Creating and Modifying the Client Options File (Required)	5
Registering Your Workstation with a Server (Required)	7

Optional configuration tasks include the following:

Task	Page
Creating an Include-Exclude List (Optional)	8
Accessing Remote NetWare Servers	15

Updating AUTOEXEC.NCF (Required)

After the installation program completes, use a text editor to add the following entry to your NetWare server's autoexec.ncf file:

```
search add VOLUME:INSTALL_DIRECTORY
```

where VOLUME:INSTALL_DIRECTORY is the destination you specified for the installation files.

Creating and Modifying the Client Options File (Required)

During installation, Tivoli Storage Manager provides a sample client option file called dsm.smp. This file is a template containing options required to establish client-server communications. By default, Tivoli Storage Manager places the dsm.smp file in SYS:\tivoli\tsm\client\ba or in another location you select during installation.

To create and customize your own client options file:

1. From a NetWare requestor, change your current directory to the Tivoli Storage Manager installation directory.
2. Copy the dsm.smp file to dsm.opt by entering:

   ```
   copy dsm.smp dsm.opt
   ```
3. Start the NetWare text editor using the **load edit** command. Use the NetWare **load edit** command with caution because loss of data can occur. This text editor is normally used to modify small text files. Do not edit large files with this utility. Or you can use an editor from the NetWare requester machine.
4. Modify the required options according to your needs. The following options are required to establish communication with a Tivoli Storage Manager server:

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```
NODename           ABNERYOUNG

  COMMmethod         TCPIP
  TCPPort            1520
  TCPServeraddress   node.domain.company.com
```

You can also specify the following types of options in your `dsm.opt` file:
- Backup and archive processing options
- Restore and retrieve processing options
- Scheduling options
- Format and language options
- Command processing options
- Authorization options
- Error processing options
- Transaction processing option
- Web client options

See Chapter 9, "Using Processing Options" on page 69 for more information about these options.

You may use some options *only* with commands. For more information about these options, see Chapter 10, "Using Options with Commands" on page 149.

Setting Options in the Client Options File

This section describes how to set options in your client options file `dsm.opt`, and how to use options with commands. To set an option in this file, enter the option name and one or more blank spaces, followed by the option value. For example:

```
compression  yes
nodename     client_a
```

Some options consist of only the option name, such as ***verbose*** and ***quiet***. You can enter the entire option name or its abbreviation. For example, you can specify the ***verbose*** option as either of the following:

```
verbose
ve
```

Follow these additional rules when entering options in your client options file `dsm.opt`:
- Do not enter comments on the same line as an option.
- Indent options with spaces or tabs.
- Begin each comment with an asterisk (*) as the first character in a line.
- Enter each option on a separate line and enter all parameters for an option on the same line.
- Enter one or more blank spaces between parameters.
- Use blank lines between options.
- The maximum number of characters in a file name is 256. The maximum combined length of the file name and path name is 512 characters.

If you update the client options file while a command line or Web client session is active, you must restart the session to pick up the changes.

Registering Your Workstation with a Server (Required)

Before you can use Tivoli Storage Manager, you must register your client with the server. The process of setting up a node name and password is called *registration* and is performed by your Tivoli Storage Manager administrator.

There are two types of registration: *open* and *closed*. Your administrator chooses the type of registration for your site.

If you plan to use a Web client, you must have an administrative user ID with system privilege, policy privilege, client access authority, or client owner authority. When a new node is registered, an administrative user ID is automatically created for the node. By default, this node has client owner authority.

Using Closed Registration

With closed registration, an administrator must register your NetWare server as a client node with the server. If your enterprise uses closed registration, you need to provide the following information to your Tivoli Storage Manager administrator:

- Your node name (the value returned by the **hostname** command or the node name you specified with the ***nodename*** option).
- The initial password you want to use, if required.
- Contact information, such as your name, user ID, and phone number.

In addition to possibly defining certain options in your options file, your administrator defines the following for you:

- The policy domain to which your client node belongs. A policy domain contains policy sets and management classes, defined by your administrator, that control how Tivoli Storage Manager manages the files you back up and archive.
- Whether you can compress files before sending them to the server.
- Whether you can delete backup and archive data from server storage.

Using Open Registration

With open registration, you can register your NetWare server as a client node with the server.

The first time you start a session, Tivoli Storage Manager prompts you for information necessary to register your NetWare server with the server identified in your client options file. You need to supply your node name, a password, and contact information.

To register your NetWare server with additional servers, edit the `dsm.opt` file and change the communication options. Then, when you start a session, your NetWare server is registered.

When you use open registration:

- Your client node is assigned to a policy domain named **standard**.
- You can define whether or not to compress files before sending them to the server. See "Compression" on page 83 for more information about the ***compression*** option.
- You can delete archived copies of files from server storage, but not backup versions of files.

If necessary, your administrator can change these defaults later.

Creating an Include-Exclude List (Optional)

This is an optional task but an important one. If you do not create an include-exclude list, Tivoli Storage Manager considers all files for backup services and uses the default management class for backup and archive services.

You can create an include-exclude list to exclude a specific file or groups of files from backup services, and to assign specific management classes to files. Tivoli Storage Manager backs up any file that is not explicitly excluded. You should exclude Tivoli Storage Manager client directories from backup services. You can use the **query inclexcl** command to generate a list of the files that are currently being excluded from backup.

Specify your include-exclude list in your client options file (`dsm.opt`) . This list can also contain include-exclude statements obtained from include-exclude files which you specify with the ***inclexcl*** option.

When processing occurs, the include-exclude statements within the include-exclude file are placed at the position occupied by the ***inclexcl*** option in `dsm.opt`, in the same order, and processed accordingly.

See "Inclexcl" on page 97 for detailed information about specifying an include-exclude file using the ***inclexcl*** option.

You can also create an include-exclude list by performing the following steps:

1. Determine your include and exclude requirements
2. Locate the include-exclude section in your client options file
3. Enter your ***include*** and ***exclude*** statements using the appropriate include-exclude options as described in "Using Include-Exclude Options". Because Tivoli Storage Manager processes your include-exclude list from the bottom of the list up, it is important to enter all your include-exclude statements in the proper order. For example, in the following include-exclude list the `includefile.txt` file *is not* backed up:

   ```
   include servera\one:dev/includefile.txt
   exclude servera\one:dev/.../*
   ```

   However, in the following include-exclude list the `includefile.txt` file *is* backed up:

   ```
   exclude servera\one:dev/.../*
   include servera\one:dev/includefile.txt
   ```
4. If you wish, you can specify an include-exclude file using the ***inclexcl*** option. The file can be located in any directory to which all users on your workstation have read access. See "Inclexcl" on page 97 for more information.
5. Save the file and close it.
6. Restart Tivoli Storage Manager client to enable your new client options file.

Using Include-Exclude Options

This section provides the following:

- Brief descriptions of the ***include*** and ***exclude*** options that you can specify in your client options file (`dsm.opt`). See table references for more information about each option.
- A minimum include-exclude list that excludes system files.
- A list of supported wildcard characters that you can use to include or exclude groups of files for processing.

- Examples of how you might use wildcard characters with ***include*** and ***exclude*** patterns.

Excluding Directories

Use ***Exclude.dir*** statements to exclude all files and sub-directories in the specified directory from processing. Tivoli Storage Manager evaluates all ***Exclude.dir*** statements *first*, and removes the excluded directories and files from the list of objects available for processing. The ***Exclude.dir*** statements override all include statements that match the pattern.

Table 4. Option for Excluding Directories

Option	Description	Page
exclude.dir	Excludes a directory, its files, and all its subdirectories and their files from backup processing. For example, `exclude.dir nw6\sys:test/dan/data1` excludes `nw6\sys:test/dan/data1`, its files, and all its subdirectories and their files. However, you can still back up `nw6\sys:test/dan/data1`, its files, and all its subdirectories and their files using a selective backup, as follows: `dsmc sel -subdir=yes nw6\sys:test/dan/data1/` However, the next time you perform an incremental backup, these backup versions are expired. If you exclude a directory that was previously included, Tivoli Storage Manager marks existing backup versions of the files and directories beneath it inactive during the next incremental backup. Use this option to exclude a portion of your data in which no underlying files need to be backed up. The Tivoli Storage Manager Client API does not support this option.	93

Controlling Backup and Archive Processing

After Tivoli Storage Manager evaluates all ***exclude.dir*** statements, the following options are evaluated against the remaining list of objects available for processing.

If you exclude an object that was previously included, Tivoli Storage Manager marks existing backup versions inactive during the next incremental backup.

Table 5. Options for Controlling Backup and Archive Processing

Option	Description	Page
	Backup Processing	
exclude ***exclude.backup*** ***exclude.file*** ***exclude.file.backup***	*These options are equivalent*. Use these options to exclude a file or group of files from backup services.	93
include ***include.backup*** ***include.file***	*These options are equivalent*. Use these options to include files or assign management classes for backup processing.	98
	Archive Processing	
exclude.archive	Excludes a file or group of files from archive services.	93
include ***include.archive***	*These options are equivalent*. Use these options to include files or assign management classes for archive processing.	98

Controlling Compression and Encryption Processing

After Tivoli Storage Manager evaluates ***Exclude.dir*** and any other include-exclude options controlling backup, archive, image, and system objects, it uses the following options to determine which files undergo compression, encryption, or subfile processing.

Table 6. Options for Controlling Compression and Encryption Processing

Option	Description	Page
	Compression Processing	
exclude.compression	Excludes files from compression processing if ***compression***=*yes* is specified. This option applies to backups and archives.	93
include.compression	Includes files for compression processing if ***compression***=*yes* is specified. This option applies to backups and archives.	98
	Encryption Processing	
exclude.encrypt	Excludes files from encryption processing.	93
include.encrypt	Includes files for encryption processing.	98

Excluding System Files

We recommend that you have the following minimum include-exclude list in your client options file (`dsm.opt`):

Log files:

```
SYS:VOL$LOG.ERR
SYS:TTS$LOG.ERR
SYS:SYSTEM\SYS$LOG.ERR
SYS:SYSTEM\EVENTS.LOG
SYS:SYSTEM\SECAUDIT.LOG
SYS:SYSTEM\SYSTEM.LOG
```

General files that NetWare programs always accessed and that cannot be opened for reading:

```
SYS:SYSTEM\CMASTER.DBA
SYS:SYSTEM\BTRIEVE.TRN
SYS:SYSTEM\TSA\TSA$TEMP.*
```

These are system files that cannot be recovered without possibly corrupting the operating system. See "Tivoli Storage Manager NetWare Backup and Recovery Guide" on page 227 to identify other files to exclude.

Including and Excluding Groups of Files

To specify groups of files that you want to include or exclude, use the wildcard characters listed in Table 7 on page 11. This table applies to ***include*** and ***exclude*** statements *only*. For information about using wildcard characters in Tivoli Storage Manager commands, see "Using Wildcard Characters" on page 186.

Table 7. Wildcard and Other Special Characters

Character	Function
?	The match-one character matches any single character *except* the directory separator; it does not match the end of the string. For example: • The **pattern** ab?, **matches** abc, but **does not match** ab, abab, or abzzz. • The **pattern** ab?rs, **matches** abfrs, but **does not match** abrs, or abllrs. • The **pattern** ab?ef?rs, **matches** abdefjrs, but **does not match** abefrs, abdefrs, or abefjrs. • The **pattern** ab??rs, **matches** abcdrs, abzzrs, but **does not match** abrs, abjrs, or abkkkrs.
*	The match-all character. For example: • The **pattern** ab*, **matches** ab, abb, abxxx, but **does not match** a, b, aa, bb. • The **pattern** ab*rs, **matches** abrs, abtrs, abrsrs, but **does not match** ars, or aabrs, abrss. • The **pattern** ab*ef*rs, **matches** abefrs, abefghrs, but **does not match** abefr, abers. • The **pattern** abcd.*, **matches** abcd.c, abcd.txt, but **does not match** abcd, abcdc, or abcdtxt.
\...	The match-*n* character matches zero or more directories.

\	The directory separator character limits the scope of the search for the matching *n* characters and directories. If a pattern does not begin with a directory separator (or one does not follow the drive specification), a match-all directories is appended to the pattern. For example, these patterns are equivalent:
	`sys:*`
	`sys:.../*`
	
	Note that both characters (\) and (/) can be used as a directory delimiter.

[	The open character-class character begins the enumeration of a character class. For example: `xxx[abc] matches xxxa, xxxb, or xxxc.`
–	The character-class range includes characters from the first character to the last character specified. For example: `xxx[a-z] matches xxxa, xxxb, xxxc, ... xxxz.`
/	The literal escape character. When used within a character class it causes the next character to be treated literally. When used outside a character class, it is used as a directory separator. For example, if you wish to include the ']' in a character class, enter [.../]...]. The escape character removes the usual meaning of ']' as the close character-class character. This is also a server name delimiter when it is placed before a volume delimiter (:). For example: `servername\volumename:/directoryname/file.name`
]	The close character-class character ends the enumeration of a character class.
:	The volume separator character separates a file specification. The characters *before* the colon identify a volume name. The characters *after* the colon identify either a directory name or a file name. For example: `volumename:/directoryname/file.nam`

Examples Using Wildcards with Include and Exclude Patterns

Tivoli Storage Manager accepts the ***exclude.dir*** option which can be used to exclude directory entries. However, ***include*** and ***exclude.dir*** cannot be used together. For example, the following statements will *not* produce the desired results:

```
exclude.dir nds:.o=adsm
include nds:.o=adsm.ou=tucson.*
```

You must code the following statements to include only the objects in the **.o=adsm.ou=tucson** branch of the NDS:

```
exclude nds:.o=adsm
include nds:.o=adsm.ou=tucson.*
```

Table 8 contains examples of ways you might use wildcard characters with ***include*** and ***exclude*** patterns.

Table 8. Using Wildcard Characters with Include and Exclude Patterns

Task	Pattern
Exclude all files with an extension of *.bak*, except those found on `servera` in the `one:/dev` directory.	`exclude servera\*:.../*.bak` `include servera\one:dev/*.bak`
Exclude all files and directories under any `tmp` directory that might exist on `servera`, *except* for the file `vol:/tmp/save.fil`. Include this file.	`exclude servera\*:.../tmp/.../*` `include servera\vol:tmp/save.fil`
Exclude any .obj file in any directory on `volumec`, `volumee`, `volumef`, and `volumeg`.	`exclude servera\volume[ce-g]:/.../*.obj`
Exclude the `.obj` files found in the root directory in the `volumed` drive *only*.	`exclude servera\volumed:*.obj`
Exclude any file that resides under the `tmp` directory found in any file space on any volume.	`exclude servera\*:tmp/.../*`
Exclude the `servera\volumed:mydir/test1` directory and any files and subdirectories under it.	`exclude.dir servera\volumed:mydir/test1`
Exclude all directories under the `mydir` directory with names beginning with `test`.	`exclude.dir servera\volumed:mydir/test*`
Exclude all directories directly under the `mydir` directory with names beginning with `test`, on any volume.	`exclude.dir servera\*:mydir/test*`

Processing Include and Exclude Options

The Tivoli Storage Manager server can define include-exclude options using the ***inclexcl*** parameter in a client option set. The include-exclude statements specified by the server are evaluated along with those in the client options file (`dsm.opt`). The server include-exclude statements are always enforced and placed at the bottom of the include-exclude list and evaluated before the client include-exclude statements.

If the client options file include-exclude list contains one or more ***inclexcl*** options that specify include-exclude files, the include-exclude statements in these files are placed in the list position occupied by the ***inclexcl*** option and processed accordingly.

When performing an incremental backup, Tivoli Storage Manager evaluates all ***exclude.dir*** statements *first*, and removes the excluded directories and files from the list of objects available for processing. See "Excluding Directories" on page 9 and "Exclude Options" on page 93 for more information about the ***exclude.dir*** option.

Note: Because directory branches excluded using the ***exclude.dir*** option do not display in the GUI, setting this option prevents you from performing either selective or incremental backups of data in the excluded directories from the GUI.

After evaluating all ***exclude.dir*** statements, Tivoli Storage Manager evaluates the include-exclude list from the bottom up and stops when it finds an include or exclude statement that matches the file it is processing. The order in which the include and exclude options are entered therefore affects which files are included and excluded. See Chapter 9, "Using Processing Options" on page 69 for more information about the order in which all options are processed.

To display a list of all include-exclude statements in effect on your client workstation in the actual order they are processed, use the **query inclexcl** command. See "Query Inclexcl" on page 205 for more information.

The client program processes the ***include*** and ***exclude*** options as follows:

1. Files are checked; directories are *only* checked if the ***exclude.dir*** option is specified.
2. ***File names are compared to the include-exclude list from the bottom up.*** When a match is found, the processing stops and checks whether the option is ***include*** or ***exclude***. If the option is ***include***, the file is backed up. If the option is ***exclude***, the file *is not* backed up.
3. If a match *is not* found, files listed are implicitly included and backed up.
4. If policy administration is in effect, files are backed up according to the default management class, or the management class you specify on a matching include option.

The following examples demonstrate *bottom up* processing.

Example 1

Assume that `servera\data:` is defined as the domain, and that you defined the following statements for the ***exclude*** and ***include*** options:

Note: In a NetWare environment, if you do not specify a server name, the client program uses the local server name.

```
exclude servera\*:*.obj
include servera\data:foo/.../*.obj
exclude servera\data:foo/junk/*.obj
```

The current file being processed is: `servera\data:foo/dev/test.obj`. Processing follows these steps:

1. Rule 3 (the last ***include*** or ***exclude*** statement defined) is checked *first* because of bottom up processing. The file, `servera\data:foo/junk/*.obj` does not match the current file name that is being processed.
2. Processing moves to Rule 2 and checks. This time, file `servera\data:foo/.../*.obj` matches the current file name that is being processed. Processing stops, the option is checked, and it is **include**.

3. File `servera\data:foo/dev/test.obj` is backed up.

Example 2

Assume that `servera\data:` is defined as the domain, and that you defined the following statements for the ***exclude*** and ***include*** options:

```
exclude servera\*:*.obj
include servera\data:foo/.../*.obj
exclude servera\data:foo/junk/*.obj
```

The current file being processed is: `servera\data:widg/copyit.bat`.
Processing follows these steps:

1. Rule 3 is checked and finds no match.
2. Rule 2 is checked and finds no match.
3. Rule 1 is checked and finds no match.
4. Because a match is not found, file `servera\data:widg/copyit.bat` is implicitly included and is backed up.

Example 3

Assume that `servera\data:` is defined as the domain, and that you defined the following statements for the ***exclude*** and ***include*** options:

```
exclude servera\*:*.obj
include servera\data:foo/.../*.obj
exclude servera\data:foo/junk/*.obj
```

The current file that processes is: `servera\data:lib/objs/printf.obj`.
Processing follows these steps:

1. Rule 3 is checked and finds no match.
2. Rule 2 is checked and finds no match.
3. Rule 1 is checked and a match is found.
4. Processing stops, the option is checked, and it is ***exclude***.
5. File `servera\data:lib/objs/printf.obj` is not backed up.

Note: ***include*** and ***exclude.dir*** cannot be used together. For example the following example is not valid:

```
exclude.dir nds:.o=adsm
include nds:.o=adsm.ou=tucson.*
```

To achieve the desired results, enter:

```
exclude nds:.o=adsm.*
include nds:.o=adsm.ou=tucson.*
```

Example 4: Backing up the NDS

To back up objects in container `.ou=islands.o=greece`, code the following statements in the `dsm.opt` file:

```
exclude nds:.o=greece.*
include nds:.o=greece.ou=Islands.*
```

You must specify the syntax as it appears in the examples.

Notes:

1. ***Include*** and ***exclude*** processing does not affect processing of container entries. All containers are backed up.
2. The NDS names that are stored by Tivoli Storage Manager are case sensitive; file space qualifiers are not.

Accessing Remote NetWare Servers

You can access other NetWare servers with Tivoli Storage Manager if you have one of the following:

- The NetWare administrator password
- The supervisor password for each server
- A user ID and password with administrator or supervisor equivalence

To back up, restore, archive, and retrieve files on remote NetWare 5.1 and NetWare 6 servers, you must have:

- **Version 5.1 NetWare server**: Run SMDR.NLM on the local server, and TSA500..NLM or TSANDS.NLM and SMDR.NLM on the remote server.
- **Version 6 NetWare server**: Run SMDR.NLM on the local server, and TSA600.NLM or TSANDS.NLM and SMDR.NLM on the remote server.

When requesting Tivoli Storage Manager services, specify the remote NetWare server name and volume at the beginning of any directory, file, or path name you want to operate on. When you try to contact a remote NetWare server, you are prompted for an ID and a password if one of the following occurs:

- You do not specify the ***nwuser*** option.
- You initially start a Tivoli Storage Manager session and are prompted for your client node ID and password.
- You initially connect to another NetWare server.
- Your supervisor password or passwords expire.
- Your Tivoli Storage Manager client node password has changed.

For details about the ***nwuser*** option, see "Nwuser" on page 110.

Chapter 3. Getting Started

This chapter includes instructions for the following tasks:

Task	Page
Starting a Session	18
Using Batch Mode	18
Using Interactive Mode	19
Starting a Web Client Session	20
Tivoli Storage Manager Firewall Support	23
Sorting File Lists	24
Displaying Online Help	25
Ending a Session	25

Tivoli Storage Manager Client Authentication

When using the native backup-archive GUI or command line clients, or the Web client, you can logon using a nodename and password *or* administrative user ID and password. Tivoli Storage Manager prompts for your user ID and compares it to the configured nodename. If they match, Tivoli Storage Manager attempts to authenticate the user ID as a nodename. If the authentication fails or if the user ID does not match the configured nodename, the client attempts to authenticate the user ID as an administrative user ID.

To use an administrative user ID with any of the backup-archive clients, the user ID must have one of the following authorities:

- *System privilege* - Authority over the entire system.
- *Policy privilege* - Authority over the node's domain.
- *Client owner* - Authority over the configured nodename. With client owner authority, you own the data and have physical access to it.

To use the Web Client, you need to have an administrative user ID with client access authority over the configured nodename. From the Web Client, you can back up and restore files on the client machine you are remotely accessing. However, you cannot use a remote Web Client to restore files to your local machine. With client access authority you do not have physical access to the data. If you want access to the Web Client for your own use, but wish to prevent administrators with client access authority from accessing your machine remotely, specify the ***revokeremoteaccess*** option in your options file. See "Revokeremoteaccess" on page 126 for more information

Client access authority is not sufficient to access the backup-archive client and command line client. You must possess at least client owner authority.

You can use the ***virtualnodename*** option to temporarily access your node's data from another machine. This option differs from the ***nodename*** option in that, if ***passwordaccess***=*generate* is specified along with the ***virtualnodename*** option, the password is not stored on the local machine. If you specify the ***nodename*** option,

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the password is stored on the local machine. See "Virtualnodename" on page 146 for more information about the ***virtualnodename*** option.

Starting a Session

During installation of the NetWare backup-archive client, you may have updated your `autoexec.ncf` file to include the Tivoli Storage Manager directory in your path. To start Tivoli Storage Manager from this directory, begin a Tivoli Storage Manager command with **dsmc**. If you did not update `autoexec.ncf` or you want to start Tivoli Storage Manager from a different directory, you must include the directory in the command line. For example:

```
sys:tivoli/tsm/client/ba/dsmc
```

You can start a client command session from a NetWare server in either batch or interactive mode.

Using Batch Mode

Use *batch* mode when you want to enter a single client command. You must precede each command with **dsmc**.

If a Tivoli Storage Manager password is required at your NetWare server, Tivoli Storage Manager prompts you for your password each time you enter a command. For example, to issue the **incremental** command, enter the following at the NetWare colon prompt:

```
dsmc incremental
```

If your client node name is **nwserver**, Tivoli Storage Manager responds:

```
Please enter password for node "nwserver":
```

When you type in your password and press Enter, the password does not display on your screen.

You can also enter your password with the command. For example, to issue the **incremental** command with your password in batch mode, enter the following:

```
dsmc incremental –password=secret
```

where `secret` is your password.

If Tivoli Storage Manager is unable to authenticate your ID and password, you are returned to the NetWare colon prompt without being able to use Tivoli Storage Manager services. If Tivoli Storage Manager authenticates your ID and password, it asks you for your NetWare user ID:

```
Please enter NetWare user for "nwserver":
```

Next, Tivoli Storage Manager requests your NetWare password.

```
Please enter the password on "nwserver" for NetWare user "username":
```

After your NetWare ID and password are accepted, the command processes, displays any messages it generates, and returns to the NetWare colon prompt.

Using Interactive Mode

Use *interactive* mode when you want to issue a series of commands. Because Tivoli Storage Manager establishes the connection to the server only once for interactive mode, you can process a series of commands more quickly in interactive mode than in batch mode.

To start a client command session in interactive mode, enter the **dsmc** or **dsmc loop** command:

```
dsmc
dsmc loop
```

When you press Enter, this prompt displays on your screen:

```
tsm>
```

When you are in interactive mode, do not precede commands with **dsmc**. For example, instead of typing **dsmc archive** to archive a file, type only **archive**.

The first time you enter a command in an interactive session, Tivoli Storage Manager prompts you for your password, if a password is required. For example, if you enter the following as the first command in your session:

```
incremental
```

Tivoli Storage Manager responds:

```
Please enter password for node "nwserver"
```

When you type your password and press Enter, the password does not display on your screen.

You can also enter your password with the **loop** command:

```
dsmc loop –password=secret
```

If Tivoli Storage Manager is unable to authenticate your ID and password, you cannot use Tivoli Storage Manager services. If Tivoli Storage Manager authenticates your ID and password, it then asks you for your NetWare user ID:

```
Please enter NetWare user for "nwserver":
```

Next, you are prompted for your NetWare password.

```
Please enter the password on "nwserver" for NetWare user "username":
```

After your NetWare ID and password are accepted, Tivoli Storage Manager processes your command, displays any messages it generates, and returns to the `dsmc>` prompt.

If you have specified ***nwpwfile*** *yes* in your client options file, Tivoli Storage Manager saves your NetWare ID and password in a file in your installation directory with a **.PWD** extension. When you enter additional commands within the same interactive session, Tivoli Storage Manager gets your NetWare ID and password from this file instead of prompting you for them. For more information on the ***nwpwfile*** option, see "Nwpwfile" on page 109.

After you start an interactive session, some options are valid in interactive mode and *remain in effect* throughout the session unless you reenter them with a different setting. However, most options are valid only on the initial command line. To identify which options must be entered in this way, see Chapter 10, "Using Options with Commands" on page 149. If Tivoli Storage Manager does not find an options

file, it displays an error message and stops processing. In this case, see your administrator to determine the name of the options file Tivoli Storage Manager should use.

Starting a Web Client Session

You can use the Web client to perform backup, archive, restore, and retrieve operations from workstations or platforms that support at least a JRE 1.3.1 Swing-enabled browser. The Web client facilitates the use of assistive devices for users with disabilities and contains improved keyboard navigation. The native look and feel of the platform running the browser is preserved.

The Web client runs on the following browsers:
- Netscape Navigator 6.0 or later with the Java support option installed.
- Netscape Navigator 4.7 or later with Java Plug-in 1.3.1
- Microsoft Internet Explorer 5.0 or later with Java Plug-in 1.3.1

You can use the Web client in conjunction with Tivoli Storage Manager Web Client Agent for NetWare to provide a graphical user interface from a Web browser.

To run the Web Client from Netscape browsers, **Enable JavaScript** must be checked. This setting is enabled by default, but to verify it:
1. Open Netscape Navigator's **Edit** menu and select **Preferences**.
2. In the Preferences dialog under Category, select **Advanced**.
3. Ensure there is a check mark next to **Enable JavaScript**.

For Microsoft Internet Explorer browsers, you must enable the **Scripting of Java applets**. This setting is also enabled by default, but to verify it:
1. Open the **Tools** menu and select **Internet Options**
2. From the Internet Options dialog, select the **Security** tab.
3. Click the Web content zone in which you will be using the Tivoli Storage Manager Web client and then click the **Custom Level** button.
4. In the Security Settings dialog, ensure that **Enable** is selected under the **Scripting of Java applets** setting.

If your browser does not have the correct level of the Java plug-in, the Web client will notify you and will try to automatically install the correct plug-in for you.
- For Microsoft Internet Explorer browsers: The Web client will automatically download and install the 1.3.1_01 JRE Plug-in for you. If a different level of the JRE exists on your workstation, the 1.3.1_01 JRE is installed into a separate directory.
- For Netscape browsers: The Tivoli Storage Manager Web client will provide the link to the web site where you can download the latest 1.3.1 plug-in. Netscape browsers do not support the automated plug-in and JRE installation.
- For browsers running on HP, AIX, and SGI platforms: Downloading the plug-in and JRE requires registration at their web sites, so the Tivoli Storage Manager Web client cannot automate the JRE installation on these platforms. Instead, the Web client displays a message containing a link to the appropriate URL from which you can manually install the JRE.

You can download and install the JRE 1.3.1 (unless otherwise noted) plug-in manually from the appropriate URL:
- For Windows, Solaris, Linux:

  `http://java.sun.com/j2se/1.3/jre/`
- AIX:

http://www-106.ibm.com/developerworks/java/jdk/aix/index.html
Version 1.3.0

- HP-UX:

  http://www.hp.com/products1/unix/java/java2/sdkrte1_3/downloads/index.html

- SGI IRIX:

  http://www.sgi.com/developers/devtools/languages/javaplugin131.html

Note: **Note for proxy server users**: The JRE 1.3.1 may return a security exception if the Tivoli Storage Manager Web Client attempts to open a TCP/IP socket to a socks server to communicate with the Tivoli Storage Manager Remote Client Agent. To avoid this, you can use one of the following methods to bypass a proxy server, allowing the Web client to establish a direct connection to the Agent machine:

- **Change your Java plug-in settings**:

  For Windows:

  1. Open the Windows **Start** menu and select **Settings** —→ **Control Panel**.
  2. In the Control Panel, double-click **Java Plugin**.
  3. In the Java Plug-In Control Panel, select the **Proxies** tab and uncheck the **Use browser settings** check box.

  For UNIX:

  1. Change directory to the installation directory of your JRE, and then change directory to the `bin` directory.
  2. Run the `JavaPluginControlPanel` executable and click the **Proxies** tab.
  3. Uncheck **Use browser settings**.

- **Change your browser settings to enable a direct connection to the Internet**:
  - For Netscape Navigator: Open the **Edit** menu and select **Preferences**. Under Category, expand the **Advanced** section, select **Proxies**, and click **Direct connection to the Internet**.
  - For Internet Explorer: Open the **Tools** menu and select **Internet Options...**. Select the **Connections** tab, and click the **LAN Settings** button. Uncheck the **Use a proxy server** check box.

Additional information about running Swing applets can be found in the Sun's Java Tutorial:

http://java.sun.com/docs/books/tutorial/uiswing/start/swingApplet.html

You can back up and restore your own data, or an administrator can centralize the backup or restore operations of many clients. To use the Web client, specify the URL of the client workstation running the Web client in your Web browser. You also need to specify the local host port number; the default is 1581. The Web client is supported when used in conjunction with a Tivoli Storage Manager server that is Version 3 or higher.

Note: Entering a different URL or pressing the browser **Back** button during an operation disconnects the Web client and causes the current operation to end.

Setting User Privileges

If you plan to use the Web client, ensure that you were assigned an administrative user ID with system privilege, policy privilege, client access authority, or client owner authority. See "Tivoli Storage Manager Client Authentication" on page 17 for more information about these authorities.

Note: Use the ***revokeremoteaccess*** option to restrict an administrator with client access privilege from accessing your workstation through the Web client. Administrators with client owner privilege, system privilege, or policy privilege can access the Web client. See "Revokeremoteaccess" on page 126 for more information about the ***revokeremoteaccess*** option. See "Tivoli Storage Manager Client Authentication" on page 17 for more information about access authorities.

Installing and Using the Web Client

If you did not install the Web client during the installation process, you can use the command line to install and configure it.

To install and configure the Web client from the command line, perform the following steps:

1. Ensure that you specify ***passwordaccess*** *generate* and ***nwpwfile*** *yes* in the client options file (`dsm.opt`). For more information on ***passwordaccess***, see "Passwordaccess" on page 114.
2. Start the backup-archive client (dsmc.nlm) by entering:

   ```
   dsmc query session
   ```

   when prompted, enter your Tivoli Storage Manager node name and password to authenticate with the server.
3. To authenticate with the NetWare TSA, enter:

   ```
   dsmc query tsa
   ```

   when prompted, enter your NetWare user ID and password to authenticate with the NetWare server.
4. If you have NDS installed, enter:

   ```
   dsmc query tsa nds
   ```

   when prompted, enter your NetWare user ID and password to authenticate with the NetWare tree under which the NetWare server belongs.
5. Install the Client Acceptor Service by entering the following command:

   ```
   dsmcutil install cad /name:"TSM CAD" /node:nodename /password:password
   ```
6. Install the Remote Client Agent Service by entering the following command:

   ```
   dsmcutil install remoteagent /name:"TSM AGENT" /node:nodename
        /password:password /partnername:"TSM CAD"
   ```
7. Start the client acceptor program by entering: **dsmcad** from the NetWare console. The remote client agent program (`dsmagent.nlm`) starts automatically when needed.

   The only options you can use with the **dsmcad** command are ***optfile*** and ***httpport***.

   All Web client messages are written to the Web client log file, `dsmwebcl.log`. Error messages are written to the error log file `dsmerror.log`, or the file you specify with the ***errorlogname*** option. The `dsmwebcl.log` and `dsmerror.log` files reside in the current working directory. See Chapter 9, "Using Processing Options" on page 69 for more information.

8. To access the Web client from a network that is DNS enabled, enter the following URL from any supported browser:

   ```
   http://your_machine_name:1581
   ```

   To access the Web client from a network that is not DNS enabled, enter the following URL from any supported browser:

   ```
   http://your_machine_IP_address:1581
   ```

   where *your_machine_name* and *your_machine_IP_address* is the host name and the IP address, respectively, of the machine running the Web client.

Port 1581 is the default port number. Your administrator can set a different port number using the ***httpport*** option. See "Httpport" on page 96 for more information.

You can also access the Web client workstation through the Web administrative GUI.

Tivoli Storage Manager Firewall Support

In most cases, the Tivoli Storage Manager server and clients can work across a firewall. The ports that the client and server need to communicate must be opened in the firewall by the firewall administrator. Because every firewall is different, the firewall administrator may need to consult the instructions for the firewall software or hardware in use.

The ports that the firewall needs to define are those ports that are needed for the client to connect to the Tivoli Storage Manager server. If the server is listening on port 1500 then the firewall software needs to forward the port to the Tivoli Storage Manager server machine.

To allow clients to communicate with a server across a firewall, you must open the TCP/IP port for the server using the ***tcpport*** option in the server options file. The default TCP/IP port is 1500.

To allow the Web client to communicate with remote workstations across a firewall, you must open the HTTP port for the remote workstation using the ***httpport*** option in the remote workstation's client option file. The default HTTP port is 1581.

You must open the two TCP/IP ports for the remote workstation client using the ***webports*** option in the remote workstation's option file. Values for the ***webports*** are required. If you do not specify the values for the ***webports*** option, the default zero (0) causes TCP/IP to randomly assign two free port numbers. See "Webports" on page 147 for more information about the ***webports*** option.

To use the administrative Web interface for a server across a firewall, you must open the port that is the HTTP port for the server using the ***httpport*** option in the server options file. The default HTTP port is 1580.

In an enterprise environment, we strongly recommend that you use the Tivoli Storage Manager Secure Web Administrator Proxy for Web administration of the Tivoli Storage Manager server. Install the proxy on a Web server that sits on the firewall so that the Web server can access resources on both sides of the firewall (this is sometimes called the *demilitarized zone*). When you set up the proxy, you can use it to administer any Tivoli Storage Manager server at Version 3.7 or higher. For more information on how to install and use the proxy, see the appendix about

the Web proxy in the Tivoli Storage Manager Quick Start manual. You can also increase security in this environment by enabling HTTPS services (also called secure socket layer or SSL) on the Web server where you install the proxy. Check your Web server documentation for information on how to set this up.

When using Tivoli Storage Manager across a firewall, please consider the following:

- To use the Web client to connect to a client across a firewall, the Web client and the backup-archive client must be Version 4.1.2 or later.
- To enable the backup-archive client, command line admin client, and the scheduler (running in polling mode) to run outside a firewall, the port specified by the server option ***tcpport*** (default 1500) must be opened by the firewall administrator.

  Note: Tivoli Storage Manager does not support the scheduler running in *prompted* mode outside a firewall. In *prompted* mode the Tivoli Storage Manager server needs to contact the client. In order to do this, some software must be installed on the Tivoli Storage Manager server to route the request through the firewall. This software routes the server request through a sock port on the firewall. This is typically called *socksifing* a system. Proxies are not supported, since they only route a few types of communication protocols (HTTP, FTP, GOPHER) and Tivoli Storage Manager is not one of these communication protocols that are routed. It is important to note that the client creates a new connection to the Tivoli Storage Manager server when prompted. This means that the firewall configuration discussed above must be in place.
- The server cannot log events to a Tivoli Enterprise Console server across a firewall.

Accessing the NetWare Server

Tivoli Storage Manager requires two connections to the NetWare server for normal operations. These two connections do not count against the licensed user connections. For example, if you have a five-user NetWare server, Tivoli Storage Manager uses connection numbers 6 and 7.

Sorting File Lists

On the Web client you can sort a list of files by various attributes, such as name, directory, size, or modification date. Sorting files by the last backup date can be useful in determining what date and time to use for the point-in-time function (see "Performing a Point-in-Time Restore" on page 44).

To sort a file list, select one of the **Sort by** items from the **View** menu bar. You can also click the appropriate column heading in the **File List** box.

The **Show active/inactive files** menu option controls whether to display both active and inactive backup versions of files. An *active* file is the most recent backup version of a file that existed on your workstation when you ran your last backup. All other backup versions of that file are called *inactive*. Only active backup versions of files display during a session, unless you select the **Show active/inactive files** menu option. If you delete the file from your workstation, the active version becomes inactive the next time you run an incremental backup.

On the command line client, you can use the ***inactive*** and ***pick*** options with query and restore commands to display both active and inactive objects. See "Inactive" on page 165 and "Pick" on page 171 for more information.

Displaying Online Help

You can display online help by entering the **Help** command. A menu of topics is displayed for which help is available. See "Help" on page 193 for more information about the **Help** command.

On the Web client:
- Select the **Help** menu.
- Click the **Help** button in current window.

Ending a Session

In batch mode, each **dsmc** command you enter is a complete session. Tivoli Storage Manager ends the session when it finishes processing the command.

To end an interactive session, enter **quit** at the `dsmc>` prompt.

To end a Web client session, open a different URL, or close the browser.

Online Forum

To participate in online user discussions of Tivoli Storage Manager, you can subscribe to an Internet Listserv forum. This is not officially supported by Tivoli Storage Manager, but support people do participate in the discussions, along with other users.

You can subscribe by sending a note to **Listserv@vm.marist.edu** that contains:

```
subscribe adsm-l yourfirstname yourlastname
```

Posts can then be sent to **adsm-l@vm.marist.edu**.

Other Sources of Online Help

An anonymous FTP server is available where you can find PTF maintenance and other Tivoli Storage Manager-related materials. Four other anonymous servers are unofficially maintained by non-IBM volunteers. These servers are:

```
ftp.software.ibm.com/storage (primary - IBM)
ftp.rz.uni-karlsruhe.de (mirror - Germany)
ftp.wu-wien.ac.at (mirror - Austria)
ftp.cac.psu.edu (mirror - Pennsylvania)
sunsite.unc.edu/pub/packages (mirror - North Carolina)
```

If you have the required username and password, you can get maintenance information from the Tivoli Storage Manager support page at:

```
http://www.tivoli.com/support/storage_mgr/tivolimain.html
```

Contacting Customer Support

For support for this or any Tivoli product, you can contact Tivoli Customer Support in one of the following ways:

- Visit the Tivoli Storage Manager technical support Web site at:

  `http://www.tivoli.com/support/storage_mgr/tivolimain.html`
- Submit a problem management record (PMR) electronically at **IBMSERV/IBMLINK**. You can access the IBMLINK from the IBM Web site at:

  `http://www.ibmlink.ibm.com`

- Submit a problem management record (PMR) electronically from the Tivoli Web site at:

  `http://www.tivoli.com/support`
- Send e-mail to: **support@tivoli.com**.

Customers in the United States can also call 1-800-TIVOLI8 (1-800-848-6548). For product numbers 5697-TS9, 5697-DRS or 5697-DPM call 1-800-237-5511.

International customers should consult the Tivoli Web site for customer support telephone numbers.

If you have a problem with any Tivoli product, you can contact Tivoli Customer Support. See the Tivoli Customer Support Handbook at the following Web site:

`http://www.tivoli.com/support/handbook`

When you contact Tivoli Customer Support, be prepared to provide identification information for your company so that support personnel can readily assist you. Company identification information may also be needed to access various online services available on the Web site.

The Tivoli Customer Support Web site (`http://www.tivoli.com/support/`) offers a guide to support services (the Customer Support Handbook); frequently asked questions (FAQs); and technical information, including release notes, user's guides, redbooks, and white papers. You can access Tivoli publications online at:

`http://www.tivoli.com/support/documents/`

The documentation for some products is available in PDF and HTML formats. Translated documents are also available for some products.

To access most of the documentation, you need an ID and a password. To obtain an ID for use on the support Web site, go to:

`http://www.tivoli.com/support/getting/`

You can order documentation by e-mail at **swdist@tivoli.com**. Please provide the publication number, part number, or order number of the desired document. Alternatively, you can provide the document title, version number, and date of publication.

We are very interested in hearing about your experience with Tivoli products and documentation. We also welcome your suggestions for improvements. If you have comments or suggestions about our documentation, please contact us in one of the following ways:

- Send e-mail to **pubs@tivoli.com**.
- Complete our customer feedback survey at:

  `http://www.tivoli.com/support/survey/`

Chapter 4. Backing Up Your Data

A primary function of Tivoli Storage Manager is to create and maintain a set of backup versions of the files on your NetWare server. This allows you to recover older versions of your files if the current files are lost or damaged. This chapter covers different ways to back up files, and how to restore these files when you need them.

As a quick reference, this chapter provides instructions for the following tasks:

Table 9. Backing Up Your Data

Task	Page
Performing Command Line Backups	35
Using the Web Client to Back Up Data	37
Requesting Backup and Archive Services for Remote Servers	39

A Checklist to Help Plan Your Backups

If you are a first-time user, or if you only back up files occasionally, you may wish to use Table 10 as a checklist of preliminary steps to consider before performing a backup.

Table 10. Preliminary Steps for Backing Up Files

___	Decide whether you want to backup files or archive them. See "Do You Want to Back Up or Archive Files?" on page 28 for more information.
___	Determine whether you need support for files with long names. See "Support for Long Names" on page 32 for more information.
___	Create an include-exclude list to specify files and directories you want to exclude from backup services. See "Using the Include-Exclude List to Control Processing" on page 35 for more information.
___	If your workstation is low on memory, decide whether performance is important. See "Running an Incremental Backup on a Memory-Constrained Machine" on page 35 for more information.
___	Decide what type of backup you want according to your needs. See the following sections for more information: "Full Incremental Backup" on page 29, "Incremental-By-Date Backup" on page 31, and "Full Incremental versus Partial Incremental, Incremental-by-date Backups" on page 31
___	If a file is important, ensure that it is closed before backing it up. See "Backing Up Open Files" on page 38 for more information.
___	For further backup considerations, see "Backing Up Files: Additional Topics" on page 40.

Encryption

You can encrypt the data that is sent to the server during a backup or archive operation using standard DES 56-bit encryption. Use the ***include.encrypt*** and ***exclude.encrypt*** options to select files for encryption processing. By default, the client does not encrypt files unless you include them for encryption processing

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using the ***include.encrypt*** option. For more information about the ***include.encrypt*** option, see "Include Options" on page 98. For more information about the ***exclude.encrypt*** option, see "Exclude Options" on page 93.

To encrypt file data, you must select an encryption key password, which Tivoli Storage Manager uses to generate the encryption key for encrypting and decrypting the file data. You can save the encryption key password in the TSM.PWD file using the ***encryptkey*** option. While restoring the encrypted file, the client prompts you for the key password to decrypt the file in the following cases:

- If you set the ***encryptkey*** option to `Prompt`.
- If the encryption key password you supply at the prompt does not match.
- If you set the ***encryptkey*** option to `Save` and the local key available does not match.

For more information about this option, see "Encryptkey" on page 90.

Do You Want to Back Up or Archive Files?

When the backup-archive client backs up or archives a file, it sends a copy of the file and its associated attributes to the server; however, backups and archives have different goals.

Backups protect against file damage. The server maintains a sequence of backup versions for each file that you back up, and older versions are deleted as newer versions are made. The number of backup versions the server maintains is set by your administrator.

Note: If you need to frequently create archives for the same data, consider using instant archives (backup sets) instead. Frequent archive operations can create a large amount of metadata in the server database increasing database growth and decreasing performance for operations such as expiration. See "Restoring Data from a Backup Set" on page 46 for more information on how backup sets can be generated and restored.

Archive copies are more permanent. They maintain a file in a particular state indefinitely, (although your administrator can limit how long archives are kept). The server can store an unlimited number of archive versions of a file. Archives are useful if you need to go back to a particular version of your files, or you want to delete a file from your NetWare server and retrieve it at a later time, if necessary. For example, you might need to save spreadsheets for tax purposes, but because you are not using them, you do not want to leave them on your NetWare server. See Chapter 6, "Archiving and Retrieving Files" on page 49 for more information about archiving and retrieving files.

Use backups to protect against unforeseen damage to your files, and use archives for maintaining more permanent versions of your files.

Backing Up Files and Directories

Your administrator might have set up schedules to back up files on your NetWare server automatically. See Chapter 7, "Automating Tasks" on page 53 for information on checking and running the schedules available to you. The following sections discuss how to back up files without using a schedule.

Understanding Which Files are Backed Up

When you request an incremental backup, Tivoli Storage Manager backs up a file if all of the following requirements are met:

- The file is not specified in an exclude statement in your include-exclude list. If you do not have an include-exclude list, all files are considered eligible for backup.
- The selected management class contains a backup copy group. See Chapter 7, "Automating Tasks" on page 53 for more information on management classes and backup copy groups.
- The file meets the serialization requirements defined in the backup copy group. If serialization is *static* or *shared static*, and the file is in use each time Tivoli Storage Manager attempts to back it up, the file is not backed up. See "Using Management Classes and Copy Groups" on page 59 for more information.
- The file meets the mode requirements defined in the backup copy group. If the mode is *modified*, the file must have changed since the last backup. If the mode is *absolute*, the file can be backed up even if it has not changed. See "Using Management Classes and Copy Groups" on page 59 for more information.
- The file meets the frequency requirements defined in the backup copy group. The minimum number of days since the last backup must elapse before a file is backed up. See "Using Management Classes and Copy Groups" on page 59 for more information. (Frequency is ignored for partial incrementals.)

The the server can also define include-exclude statements in the include-exclude list. To view the contents of your include-exclude list, use the **query inclexcl** command.

Attention: When you run an incremental backup, the client also backs up all directory information. When you back up a file, the directories in the path that contain the file are also backed up. Directories and NDS container objects are counted in the number of objects backed up.

There are three types of incremental backup: ***full incremental***, ***Incremental-By-Date***, and ***selective***. You can use all types of backup to back up the NDS. In addition, Tivoli Storage Manager saves trustee rights, file attributes, name spaces, and associated name space information with the backup versions of the files.

Full Incremental Backup

The first time you run a full incremental backups, Tivoli Storage Manager backs up all of the files and directories on the volumes you specify. This process can take a long time if you have several files to back up. Successive full incremental backups will only back up new and changed files. This allows the backup server to maintain current versions of your NetWare server files, without having to waste time or space by backing up files that already exist in server storage. Depending on your storage management policies, the server may keep more than one version of your files in storage. The most recently backed up files are active backup versions. Older copies of your backed up files are inactive versions. However, if you delete a file from your NetWare server, the backup server will not maintain an active backup version of that file. If you need to retrieve a file you have deleted, you will need to access the backup server's inactive file versions. See Chapter 8, "Understanding Storage Management Policies" on page 59 for more information about storage management polices.

To perform a full incremental backup see "Performing Command Line Backups" on page 35 for more information.

During an incremental backup, the client queries the server to determine the exact state of your files since last incremental backup. The client uses this information to:

- Rename files if the information about the NetWare volume name has changed.
- Back up new files
- Back up files whose contents changed since the last backup. Changes include *any* of the following:
  - File size
  - Date or time of last modification
  - File attributes, except for the A attribute (the archive attribute). The client ignores the archive attribute because other programs change the attribute during file copying, even if the file does not change. When you restore a file, Tivoli Storage Manager restores the attributes to what they were when you backed up the file.
  - Trustee rights
- Back up files whose directory attributes have changed.
- Expire backup versions of files on the server that do not have corresponding files on the workstation. The result is that files which no longer exist on your NetWare server will not have active backup versions on the server.
- Rebind backup versions to management classes if you change management class assignments, even if you do not back up the file.

Attention: If a file's modification timestamp changes, it will be backed up during the next full incremental backup. The directories in the path that contain the file are also backed up, unless they already exist on the server. A directory that already exists on the server is only backed up again if its permissions or time stamp change. Directories and NDS container objects count in the number of objects backed up. To exclude directories from backup, use the ***exclude.dir*** option. For more about ***exclude.dir***, see "Exclude Options" on page 93.

Understanding Which Files are Backed Up

When you requst a backup, Tivoli Storage Manager backs up a file if all of the follwing requirements are met:

- You do not exclude the file backup in your include-exclude list. If you do not have an include-exclude list, all files will be candidates for backup.
- The selected management class contains a backup copy group. See Chapter 7, "Automating Tasks" on page 53 for more information on management classes and backup copy groups.
- The file meets the serialization requirements defined in the backup copy group. If serialization is *static* or *shared static*, and the file is in use during back up, the backup does not occur. See "Using Management Classes and Copy Groups" on page 59 for more information.
- The file meets the mode requirements defined in the backup copy group. If the mode is *modified*, the file must have changed since the last backup. If the mode is *absolute*, the file can be backed up even if it does not change. See "Using Management Classes and Copy Groups" on page 59 for more information.
- The file meets the frequency requirements defined in the backup copy group. The specified minimum number of days since the last backup must elapse before a file is backed up. Frequency is ignored for partial incremental backups. See "Using Management Classes and Copy Groups" on page 59 for more information.

Incremental-By-Date Backup

For a disk or volume to be eligible for incremental-by-date backups, you must first perform a full incremental backup of that entire disk or volume. Running an incremental backup of only a directory branch or individual file will will not make the disk or volume eligible for incremental-by-date backups.

To perform an incremental-by-date backup see "Performing an Incremental-by-Date Backup" on page 36 for more information.

The client backs up only new and changed files with a modification date later than the date of the last incremental backup stored at the server, unless you exclude the file from backup services. Files added at the client after the last incremental backup, but with a modification date earlier than the last incremental, are not backed up. The directories in the path that contain the file are also backed up, unless they already exist on the server. A directory that already exists on the server is only backed up again if its modification timestamp changes. The files under the directory are also backed up even if their modification timestamps have not changed.

If you run an incremental-by-date backup of the whole file system, the server updates the date and time of the last incremental. If you perform an incremental-by-date backup on only part of a file system, the server does not update the date of the last full incremental. In that case, the next incremental-by-date backup will back up these files again.

Full Incremental versus Partial Incremental, Incremental-by-date Backups

Full incremental, partial incremental, and incremental-by-date all back up new and changed files. An incremental-by-date takes less time to process than a full incremental and requires less memory. A full incremental and an incremental-by-date backup may not place exactly the same backup files into server storage because the incremental-by-date backup:

- Does not expire backup versions of files that you delete from the NetWare server.
- Does not rebind backup versions to a new management class if you change the management class.
- Does not back up files with attributes that change, unless the modification dates and times also change.
- Ignores the copy group frequency attribute of management classes. (Journal-based backups also ignore this attribute.)
- Does not handle name space changes on the volume.

Selective Backup

Use a selective backup when you want to back up specific files or directories regardless of whether a current copy of those files exists on the server. Incremental backups are generally part of an automated system to back up entire file systems. In contrast, selective backups allow you to manually select a set of files to backup regardless of whether they have changed since your last incremental backup.

To perform a selective backup see "Performing a Selective Backup" on page 36 for more information.

Unlike incremental backups, a selective backup:

- Does not cause the server to update the date and time of the last incremental.

- Backs up directory and file entries even if their modification timestamp or permissions have not changed.

Support for Long Names

If you have file names longer than the DOS name space permits, you can specify that Tivoli Storage Manager stores the long names during backup. Long names with spaces must be enclosed in double quotes.

Tivoli Storage Manager Client Version 5.1.0 does not perform a conversion from a long to a short name space. If the Tivoli Storage Manager server name space is NTW:LONG but the local volume does not have long name support, Tivoli Storage Manager Client Version 5.1.0 issues an error message and ceases any backup or archive operation.

If you want to continue backing up using long names, add the long name space support back to the volume in question. You can also use a short name to back up the volume by renaming the file space on the server before attempting a back up.

Mac Name Space is Not Supported

Tivoli Storage Manager does not support Macintosh name space. If a NetWare volume has only DOS and Mac name spaces, Tivoli Storage Manager uses the DOS name for Macintosh file names. If you use only DOS and Mac names spaces on a NetWare volume, you should add Long name space to that volume. This will ensure that NetWare converts Macintosh file names to the Long name before the file is backed up.

The Macintosh namespace information is not lost when backing up or restoring a Macintosh file. The only issue is how the client will display the name when performing a query, restore, or retrieve operation.

Migration to the Long Name Space

Using the Long name space allows greater flexibility for backing up files whose names are longer than traditional DOS names.

To determine the name spaces that are loaded on a volume, enter **volumes** at the NetWare console, for example: `PROD1:volumes`. Information displays which is similar to the following:

```
Mounted Volumes                 Name Spaces               Flags
    SYS                           DOS, LONG               Cp Sa
    VOL1                          DOS, MAC, LONG          Cp SA
PROD1:
```

In this example, server PROD1 has 2 volumes. The SYS volume has DOS and long name spaces. VOL1 has DOS, Mac and long name spaces. The Tivoli Storage Manager client inspects these settings when it begins an operation, such as backup. The client then determines the name space used by the backed up volume. For example:

```
tsm> q file
Node Name: VONORE
Session established with server TSM: Windows NT
  Server Version 5, Release 1, Level 0
  Server date/time: 02/05/1999 05:59:45  Last access: 02/04/1999 18:34:09

Num   Last incr Date        Type      File Space Name
---   ----------------      ----      ---------------
  1   02/04/1999 18:34:46   NTWFS     PROD1\VOL1:
tsm>
```

VOL1 was last backed up with the file space type of **NTWFS** or DOS name space. When Tivoli Storage Manager starts a full incremental of VOL1, it detects that VOL1 has both Mac and long name spaces, but that the data is backed up using the DOS name space. This causes the file space to be updated to the long name space. Even though both Mac and long are loaded, Tivoli Storage Manager chooses the long name space because the Mac name space is not supported.

After a full incremental backup, the following change displays:

```
tsm> q file
Node Name: VONORE
Session established with server TSM: Windows NT
  Server Version 5, Release 1, Level 0
  Server date/time: 10/05/2000 05:59:45  Last access: 10/01/2000 20:34:09

Num   Last incr Date        Type        File Space Name
---   ----------------      ----        ---------------
  1   10/01/2000 18:34:46   NTW:LONG     PROD1\VOL1:
tsm>
```

The file space type changes from NTWFS to NTW:LONG. The client uses the long name space during the next full incremental backup. The file space is converted to use the long name space. All active and inactive files are changed to the following:

```
tsm< Q BACKUP VOL1:* -SUB=YES
Size      Backup Date        Mgmt Class A/I File
----      -----------        ---------- --- ----
    0  02/05/1999 06:33:28    STANDARD  A   VOL1:/
    0  02/05/1999 06:29:49    STANDARD  A   VOL1:/DELETED.SAV
    0  02/05/1999 06:29:49    STANDARD  A   VOL1:/Frank Ramke
1,175  02/05/1999 06:29:49    DEFAULT   A   VOL1:/VOL$LOG.ERR
    0  02/05/1999 06:29:49    STANDARD  A   VOL1:/Frank Ramke/Debbie Ramke
    0  02/05/1999 06:29:49    STANDARD  A   VOL1:/Frank Ramke/Debbie Ramke/
    Krista Breeden
    0  02/05/1999 06:29:49    STANDARD  A   VOL1:/Frank Ramke/Debbie Ramke/
    Shane Breeden
   11  02/05/1999 06:29:49    DEFAULT   A   VOL1:/Frank Ramke/1 Long File
   11  02/05/1999 06:29:49    DEFAULT   A   VOL1:/Frank Ramke/2 Long File
   11  02/05/1999 06:29:49    DEFAULT   A   VOL1:/Frank Ramke/Debbie Ramke/1
   Long File
   11  02/05/1999 06:29:49    DEFAULT   A   VOL1:/Frank Ramke/Debbie Ramke/2
   Long File
   11  02/03/1999 06:29:49    DEFAULT   I   VOL1:/FRANK RAMKE/DEBBIE RAMKE/2
   LONG FILE
tsm<
```

The last file in the list is an inactive file and is not cased properly because of the way case is preserved by the client. This migration cannot case inactive files correctly.

During a full incremental, objects are *updated*. This is when renaming occurs. For example,

```
...
Updating-->                    0 VOL1:/TOMRAMK0/DEBBIERA/SHANEBRE [Sent]
Updating-->                   11 VOL1:/TOMRAMK0/DEBBIERA/1LONGFIL [Sent]
Updating-->                   11 VOL1:/TOMRAMK0/DEBBIERA/2LONGFI0 [Sent]
Updating-->                   11 VOL1:/VONORE/1LONGFIL [Sent]
Updating-->                   11 VOL1:/VONORETE/1LONGFIL [Sent]
Successful incremental backup of 'VOL1:'
```

Converting Name Spaces Using the Web Client or Command Line

To convert from a short to a long name space, you must perform a full incremental on your file space. You can perform the conversion using either the Web client or the command line.

To use the Web client, click on the volume name, and select **Incremental (complete)** from the pull down menu at the top of the screen. To perform a full incremental on your file space from the command line, enter **dsmc i sys:**.

After converting the file space, the client backs up or archives subsequent files to a long name space.

If the Long Name conversion has started you must let it run to completion. If the conversion from a short name space to a long name space is interrupted and then restarted, you must use a 4.2.1 or higher Tivoli Storage Manager server. You may receive an error message if conversion is attempted with a lower level server.

Backing Up Before Conversion

If you run a selective backup or archive before conversion, Tivoli Storage Manager uses the current name space for the backup; that is, the name space indicated from the **query filespace** command.

You must change your Include-exclude statements to reflect the long names. Until conversion is complete, consider entering both long and short names. Long names with spaces must be enclosed in double quotes. For example:

```
exclude vol1:\frankra0/.../*
exclude "vol1:\frank ramke/.../*"
```

If files have been backed up from a volume with long name space loaded, and you attempt to restore them to a volume without long name space, the restore will fail. A message similar to the following displays:

```
02/12/1999 09:24:30 (TSA400 4.14 287)
The name space type does not exist or is invalid.
```

Use quotes to enclose a long name string that has embedded blanks.

If files are not being converted, the reason could be any of the following:

- The server is not at the correct level.
- The client is not at the correct level.

Removing a Name Space

You can use the NetWare Volume Repair Utility, `vrepair.nlm`, to remove a name space. For more information, refer to the `README` file that is shipped on the product installation media.

Running an Incremental Backup on a Memory-Constrained Machine

The performance of an incremental backup suffers if your machine runs out of available memory during the backup. If you have enough memory on your machine, you can use a more efficient method of backing up your machine. Turn off the ***memoryefficientbackup*** option in the options file:

```
memoryefficientbackup no
```

Specifying ***memoryefficientbackup*** *yes* (the default) causes Tivoli Storage Manager to back up only one directory at a time. If you have poor performance even when using ***memoryefficientbackup*** *yes*, check your communication buffer settings and the communication link between your machine and the server.

Using the Include-Exclude List to Control Processing

Usually, there are files on your disk that you do not want to back up. These files might be operating system or application files that could be easily recovered by reinstalling the program, or any other file that you could easily rebuild.

You can use the ***include*** and ***exclude*** options in the options file to specify which files to exclude from backup processing. Tivoli Storage Manager backs up any file that is not explicitly excluded. You do not need to use an ***include*** option to include specific files unless those files are in a directory you are trying to exclude.

For more information on setting up an include-exclude list, see "Creating an Include-Exclude List (Optional)" on page 8.

Performing Command Line Backups

Running a Full Incremental Backup

To run a full incremental backup, use the **incremental** command. Tivoli Storage Manager runs an incremental backup on the volumes you specify in your client domain using the ***domain*** option. The volumes you specify can include the NDS. See "Incremental" on page 194 for more information about the **incremental** command. See "Domain" on page 87 for more information about the ***domain*** option.

You can specify the volumes you want to back up in any of the following ways:

- To run a full incremental backup of your client domain, enter the following command:

  ```
  load dsmc incremental
  ```

  If you do not set the ***domain*** option in your client options file `dsm.opt`, Tivoli Storage Manager backs up all locally mounted volumes and the NDS.
- You can use the ***domain*** option with the **incremental** command to back up other volumes in addition to the volumes you specify in your default client domain. For example, if you enter the following in your client options file:

  ```
  domain sys: data: nds:
  ```

  and the following on the command line:

  ```
  load dsmc incremental -domain=usr:
  ```

  Tivoli Storage Manager performs an incremental backup for your `sys:`, `data:`, and `usr:` volumes and the NDS.

- You can back up specific volumes. For example, to back up only the `data:` and `sys:` volumes, enter the following command:

```
load dsmc incremental data: sys:
```

Performing an Incremental-by-Date Backup

Use the ***incrbydate*** option with the **incremental** command to back up new and changed files with a modification date later than the last incremental backup stored at the server. For example, to perform an incremental-by-date back up of your default client domain, enter the following command:

```
load dsmc incremental -incrbydate
```

See "Incrbydate" on page 166 for more information about the ***incrbydate*** option.

Performing a Selective Backup

You can use the **selective** command to back up specific files, a group of files with similar names, entire directories, the NDS, or the NDS. This is called a *selective backup*.

You can use more than one file specification on the **selective** command. For example, to back up the **sys:proj/test.doc** and the NDS files, use:

```
load dsmc selective sys:proj/test.doc nds
```

For more information, see "Selective" on page 221.

Backing Up Directories

If you back up a directory, you can use the ***subdir=****yes* option to include all the subdirectories under that directory in the backup.

For example, to back up the **sys:proj** directory and its subdirectories, use:

```
load dsmc selective sys:proj/ -subdir=yes
```

Displaying Backup Processing Status

During a backup, by default Tivoli Storage Manager displays the status of each file it attempts to back up. Tivoli Storage Manager reports the file's size, path, file name, total number of bytes transferred, and whether the backup attempt was successful. Similar statistics are produced by the **selective** and **archive** commands. These also display in the `dsmsched.log` file for scheduled commands.

If you have set the ***resourceutilization*** option, Tivoli Storage Manager attempts to improve performance and load balancing by using multiple sessions when it backs up a volume or other set of files.

The command line displays similar information. On the backup-archive command line the name of each file displays after it is sent to the server. The progress indicator shows overall progress. Informational messages may display as follows:

- `Directory-->`. Indicates the directory that you back up.
- `Updating-->`. Indicates that only the file meta data is sent, if file attributes change and not the data itself.
- `Expiring-->`. Indicates an object (file or directory) on the server that no longer exists on the client is expired and made inactive on the server.
- `Total number of objects inspected.`
- `Total number of objects backed up.`
- `Total number of objects updated.` These are files whose attributes, such as file owner or file permissions, have changed.

- `Total number of objects rebound.` See "Binding and Rebinding Management Classes to Files" on page 66 for more information.
- `Total number of objects deleted.` This is a count of the objects deleted from the client workstation after being successfully backed up to the server. The count is zero for all backup commands.
- `Total number of objects expired.` See "Full Incremental Backup" on page 29 for more information.
- `Total number of objects failed.` Objects can fail for several reasons. Check the `dsmerror.log` for details.
- `Data transfer time.` The total time to transfer data across the network. Transfer statistics may not match the file statistics if the operation was retried due to a communications failure or session loss. The transfer statistics display the bytes attempted to be transferred across all command attempts.
- `Network data transfer rate.` The average rate at which the network transfers data between the client and the server. This is calculated by dividing the total number of bytes transferred by the time to transfer the data over the network. The time it takes to process objects is not included in the network transfer rate. Therefore, the network transfer rate is higher than the aggregate transfer rate.
- `Aggregate data transfer rate.` The average rate at which Tivoli Storage Manager and the network transfer data between the client and the server. This is calculated by dividing the total number of bytes transferred by the time that elapses from the beginning to the end of the process. Both Tivoli Storage Manager processing and network time are included in the aggregate transfer rate. Therefore, the aggregate transfer rate is lower than the network transfer rate.

  Note: On occasion, the aggregate data transfer rate may be higher than the network data transfer rate. This is because the backup-archive client can have multiple simultaneous sessions with the backup server. When multiple sessions are open during backup, the data transfer time represents the sum of the times reported by all sessions. In this case, aggregate data transfer time is mistakenly reported as higher. However, when running with a single session, the aggregate data transfer rate should always be reported as lower than the network data transfer rate.
- `Objects compressed by.` Specifies the number of file-data bytes sent over the net divided by the original size of the file on disk. For example, if the net data-bytes are 10K and the file is 100K, then Objects compressed by: == (1 - (10240/102400)) x 100 == 90%
- `Elapsed processing time.` The active processing time to complete a command. This is calculated by subtracting the starting time of a command process from the ending time of the completed command process.
- `Total number of bytes transferred.`
- `LanFree bytes transferred.`

Using the Web Client to Back Up Data

You can use Tivoli Storage Manager to back up specific files, a group of files with similar names, or entire directories. If you have the Web client acceptor started on your workstation, you can perform the backup tasks using the Web client backup-archive GUI. See "Starting a Web Client Session" on page 20 for information on starting the Web client.

You can perform the backup tasks using the Web client backup-archive GUI, as follows:

1. Click the **Backup** button from the main window. The Backup by Tree window appears.
2. Expand the directory tree by clicking on the **+** sign. Click the selection boxes next to the object or objects you want to back up.
3. Select one of the following backup types from the pull-down menu:
   a. To run an incremental backup, click **Incremental (complete)**.
   b. To run an incremental backup by date, click **Incremental (date only)**.
   c. To run a selective backup, click **Always backup**.
4. To modify specific backup options, click the **Options** button. Any options you change are effective during the current session *only*.
5. Click **Backup**. The Backup Task List window displays the backup processing status. When processing completes, the Backup Report window displays processing details.

Considerations

- Select **File details** on the **View** menu to display file attributes for any file.
- The following functions are not supported on the Web client:
  - Estimate
  - View Policy Information
  - Access Another User
  - Searching and Filtering
  - User Access List
  - Preferences Editor

Backing Up Open Files

Some files on your system may be in use when you try backing them up (these are called *open files*, because they are opened by an application for its use). Because an open file may change, it is likely that any backup of an open file will not correctly reflect the contents of the file at a given time.

There are some files that are open exclusively to an application, that applications such as Tivoli Storage Manager cannot read for back up, regardless of the policy settings on the server which dictate taking fuzzy copies of open files. Files that are opened exclusively by other applications should be considered for exclusion from backup.

If certain files are not backed up because they are open or they get changed when Tivoli Storage Manager backs them up, consider the following:

- If the file is unimportant, or can be easily rebuilt (for example, a temporary file), you might not care that the file is not backed up.
- If the file is important:
  - Close the file before Tivoli Storage Manager attempts to back it up. If backups are run according to a schedule, use the **preschedule** option to issue a command that closes the file before the backup occurs. For example, if the open file is a database, use the database's shutdown command to shut down the database. You can use the **postschedule** option to restart the application that uses the file after the backup completes.

    If you are not using a schedule for the backup, ensure that you close the application that uses the file before you start the backup.
  - Tivoli Storage Manager can back up the file even if it is open and gets changed during the backup. This type of backup can be acceptable if it does not matter that the content of the file changes while the file is being backed up. To back up these files, assign them a management class with the

serialization **dynamic** or **shared dynamic**. See "Selecting a Management Class for Files" on page 63 for information on assigning management classes, and "Displaying Information about Management Classes and Copy Groups" on page 60 for information on determining which management classes are available to you.

Note: If the open file has its share flag set to `deny_read`, Tivoli Storage Manager cannot back it up.

Requesting Backup and Archive Services for Remote Servers

You can request backup and archive services for multiple NetWare file servers.

To back up files on a remote NetWare file server, you must either:
- Know the NetWare administrator password
- Know the supervisor password for each server
- Have a user ID and password with administrator or supervisor equivalence

Tivoli Storage Manager includes two options that relate to backing up and archiving files for remote servers:

- ***nwuser***—Allows you to specify a user ID and password for a local or remote NetWare server. You can use this option as many times as necessary in your client options file to provide password information for each remote file server for which you plan to back up and archive files.

  If you do not store password information for local or remote servers in your client options file, Tivoli Storage Manager prompts you for that information when you issue commands to back up or archive files stored on those servers.
- ***nwpwfile***—If you choose not to include password information for a local or remote NetWare server in your client options file, you can use this option to specify whether you want Tivoli Storage Manager to save the user ID and password you provide when prompted.

  If you set ***nwpwfile*** to *yes*, the first time you issue a command to back up or archive files for a local or remote NetWare server, Tivoli Storage Manager encrypts the user ID and password you provide and stores that information in the `TSM.PWD` file in your installation directory. When you issue subsequent commands to back up or archive files for that server, Tivoli Storage Manager obtains the password information from that file instead of issuing a prompt. This is the default for this option. If you are running in loop mode, the password is committed to system memory. In loop mode, other commands will then access the ID/password from memory.

  If you set ***nwpwfile*** to *no*, Tivoli Storage Manager prompts you for the user IDs and passwords for local or remote NetWare servers each time you issue a command to back up or archive files stored on those servers.

You can include volumes stored on remote NetWare file servers in your default client domain specified with the ***domain*** option in your client options file. For example, to specify the sys: volume on three remote NetWare file servers as well as all local volumes and the NDS, use:

```
domain all-local  servb\sys:  servc\sys:  servd\sys:
```

You can also use the ***domain*** option with the **incremental** command to specify volumes stored on remote NetWare file servers. For example:

```
load dsmc incremental -domain="servb\sys: servc\sys:"
```

In addition, you can selectively back up or archive files stored on a remote server. For example:

```
load dsmc selective servb\sys:test/*
load dsmc archive servc\sys:test2/proj1/
```

Backing Up Files: Additional Topics

This section discusses additional topics related to performing backups. You do not need to understand this information in order to do basic work.

Understanding How Files Are Managed

Tivoli Storage Manager uses *management classes* to determine how to manage your backups on the server. Every time you back up a file, the file is assigned a management class. The management class used is either a default chosen for you, or one you assigned to the file using the ***include*** option in the include-exclude list. The chosen management class must contain a backup copy group in order for the file to be backed up. See Chapter 7, "Automating Tasks" on page 53 for more information on management classes and how to assign them to files.

Understanding Which Files Are Backed Up

When you request a selective backup, Tivoli Storage Manager backs up a file if all of the following requirements are met:

- The file is not specified on an exclude statement in your include-exclude list. If you do not have an include-exclude list, all files are considered for backup.
- The selected management class contains a backup copy group.
- The file meets the serialization requirements defined in the backup copy group. If serialization is *static* or *shared static*, and the file is in use each time Tivoli Storage Manager attempts to back it up, the file is not backed up.

For selective backups, Tivoli Storage Manager does not check frequency or mode, and does not check to see whether a file has changed since it was last backed up. The only criteria for selective backups are that the file is not excluded from backup services and the management class associated with it has a backup copy group.

When you run a selective backup, Tivoli Storage Manager also backs up all directory information. You can exclude the files within a directory, but you cannot exclude a directory from being backed up. Directories and NDS containers are counted in the number of objects backed up.

When you use the ***volinformation*** option with the **selective** command, volume information such as disk space restrictions and volume root directory trustee rights are backed up.

Chapter 5. Restoring Your Data

You can use the **restore** command to restore backup versions of specific files, a group of files with similar names, entire directories, or backup sets. For more information on restoring backup sets, see "Restoring Data from a Backup Set" on page 46.

As a quick reference, this chapter contains instructions for the following tasks:

Table 11. Restoring Your Data

Task	Page
Performing a Command Line Restore	42
Performing Large Restore Operations	43
Performing a Point-in-Time Restore	44
Using the Web Client to Restore Files	45
Restoring Data from a Backup Set	46
Authorizing Another Client Node to Restore or Retrieve Your Files	47
Restoring or Retrieving Files from Another Client Node	47
Restoring or Retrieving Your Files to Another Client Node	47

No Query Restore

When you enter an unrestricted wildcard source file specification on the **restore** command and do not specify any of the options: ***inactive***, ***latest***, ***pick***, ***fromdate***, or ***todate***, the client uses a different method for retrieving files and directories from the server. This method is called *no query restore* because instead of querying the server for each object to be restored, a single restore request is sent to the server. This request results in files and directories being returned directly from the server without further action by the client. The client merely accepts the data coming from the server and restores it to the destination named on the **restore** command.

An example of an unrestricted wildcard command would be:

```
servera\one:dev/*
```

An example of a restricted wildcard command would be:

```
servera\one:dev/*.bak
```

When the client uses this method, the restore session is treated differently. If the restore process is interrupted for any reason, such as a power outage or network failure, the server records the point at which the restore was interrupted. This record is known to the client as a *restartable restore*. It is possible to create more than one restartable restore session. Use the **query restore** command to find out if your client has any restartable restore sessions in the server database.

The existence of a restartable restore inhibits further backups of that file system until the restartable restore is completed. If you attempt to repeat the restore that was interrupted or try to back up the destination file space, the attempt will fail because the original restore was not completed. You can restart the restore at the point of interruption by entering the **restart restore** command, or you can delete

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the restartable restore using the **cancel restore** command. If you restart the interrupted restore, it will restart with the first transaction, which may consist of one or more files, not completely restored when the interruption occurred. Because of this, you may receive some replace prompts for files from the interrupted transaction which were already restored.

The differences between the standard restore process and the no query restore process are outlined below.

Standard Restore Process

1. The client queries the server for a list of files backed up for the client file space being restored.
2. The server sends a list of backed up files that match the restore criteria. If both active and inactive files are to be restored, information about all backed up files is sent to the client.
3. The list of files returned from the server is sorted in client memory to determine the file restore order and to minimize tape mounts required to perform the restore.
4. The client tells the server to restore file data and directory objects.
5. The directories and files to be restored are sent from the server to the client.

No Query Restore Process

1. The client tells the server that a no query restore is going to be performed and provides the server with details about file spaces, directories, and files.
2. The server sorts the data using an internal sort table which minimizes tape mounts.
3. The data to be restored is sent to the client. File and directory objects stored on disk are sent immediately since sorting for such data is not required before restoring it.

For more information on using the command line to begin restartable restores, see "Restore" on page 214. For help with performing restartable restores using a GUI, follow these steps:
1. Click **Help** from the Restore window.
2. Click **Restoring Backup Versions**
3. Click **Work with restartable restore sessions**.

Performing a Command Line Restore

Do You Want To Restore an Active or Inactive Backup?

Your administrator determines how many backup versions Tivoli Storage Manager maintains for each file on your NetWare server. Frequently, the administrator maintains more than one version of each file. Having multiple versions of a file allows you to restore older versions in case the most recent backup is damaged.

Tivoli Storage Manager considers the most recent backup version to be the *active* version. Any other backup version is considered an *inactive* version.

Every time Tivoli Storage Manager backs up your files, it marks the new backup version as the active backup, and it changes what used to be the active backup to an inactive backup. When the maximum number of inactive versions is reached, Tivoli Storage Manager deletes the oldest inactive version.

Normally, you want to restore active backup versions of files. However, there might be times when you want to restore an inactive version. For example, you might want to restore a file with the contents it contained on or before a specific date. Or you might accidentally erase a file, and then run an incremental backup. The active backup version of the file is now inactive. To get your file back, you need to restore the most recent inactive backup version of the file.

The **restore** command restores only *active* backup versions of files, unless you use the following options:

- ***latest***—Causes Tivoli Storage Manager to restore the latest backup version of a file regardless of whether it is active or inactive.
- ***pick*** and ***inactive***—Causes Tivoli Storage Manager to display a list of both active and inactive backup versions of files. From that list, you can choose the versions you want to restore.

For example, if you want to restore the latest version of the deleted file **sys:h1.doc**, use:

```
load dsmc restore sys:h1.doc -latest
```

If you try to restore both an active and inactive version of a file at the same time, only the active version is restored.

You can restore a file to either its original location or to a different location. For example, to restore the **sys:doc/h1.doc** file to its original directory, use:

```
load dsmc restore sys:doc/h1.doc
```

To restore the file under a new name and directory, use:

```
load dsmc restore sys:doc/h1.doc sys:newdoc/h2.doc
```

Add the *–**subdir**=yes* option to the command if you need to restore the files in a directory and all of its subdirectories. For example, if you are recovering an entire volume (in this example, the nw3: volume), you can restore all the files using:

```
load dsmc restore nw3:* -subdir=yes
```

See “Restore” on page 214 for more information.

Performing Large Restore Operations

If you need to restore a large number of files, you can improve performance by issuing multiple **restore** commands at one time.

You can use multiple restore sessions to improve performance. In this case, you can start several restore sessions simultaneously. See “Resourceutilization” on page 123 for more information.

For example, to restore all the files in your `sys:user` file space, you could enter:

```
load dsmc restore sys:user/ -subdir=yes -replace=all -tapeprompt=no
```

However, if you issue multiple commands for directories in your `sys:user` file space, Tivoli Storage Manager can restore the files faster.

For example, you could issue these commands:

```
load dsmc res sys:user/jones/ -subdir=yes -rep=all -tapep=no
load dsmc res sys:user/smith/ -subdir=yes -rep=all -tapep=no
load dsmc res sys:user/brown/ -subdir=yes -rep=all -tapep=no
```

Or, if you need to restore multiple volumes, you could issue a **restore** command for each volume. For example:

```
load dsmc restore sys:*  -subdir=yes -replace=all -tapeprompt=no
load dsmc restore app:*  -subdir=yes -replace=all -tapeprompt=no
load dsmc restore data:* -subdir=yes -replace=all -tapeprompt=no
```

Note: If you already have the appropriate values set for the ***subdir***, ***replace*** and ***tapeprompt*** options in your client options file, you do not need to include those options in the commands.

When you issue multiple commands to restore your files, you must specify a unique part of the file space in each **restore** command. Be sure that you do not use any overlapping file specifications in the commands.

To display a list of the root directories in a file space, use the **query backup** command. For example:

```
load dsmc query backup <filespace> -dirsonly -subdir=no
```

As a general rule, you can issue from two to four **restore** commands at one time. The maximum number you can run at one time without degrading performance depends on factors such as how much memory you have and network utilization.

The speed at which Tivoli Storage Manager can restore the files also depends on how many tape drives are available, and whether your administrator is using collocation to keep file spaces assigned to as few volumes as possible.

For example, if `sys:user/jones` and `sys:user/smith` are on the same tape, the restore for `sys:user/smith` must wait until the restore for `sys:user/jones` is complete. However, if `sys:user/brown` is on a different tape, and there are at least two tape drives available, the restore for `sys:user/brown` can begin at the same time as the restore for `sys:user/jones`.

If your administrator is using collocation, the number of sequential access media mounts required for restore operations is also reduced.

Other options you can choose to use in multiple **restore** commands are:

quiet The advantage of using this option is that messages are not printed to your screen, and processing is faster. The disadvantage is that you do not receive information about individual files that are processed. Tivoli Storage Manager records only summary information.

errorlogname
You can use this option to specify a different error log file for each **restore** command. Be sure to keep track of which command goes with each log file.

Performing a Point-in-Time Restore

A **point-in-time** restore recovers a file space or a directory to a previous condition. For example, a point-in-time restore can eliminate the effect of data corruption, or recover a basic configuration to a prior condition.

You can start a point-in-time restore from the Tivoli Storage Manager backup-archive command line client, using the ***pitdate*** and ***pittime*** command line options. A point-in-time restore is supported on the file space, directory, or file level.

Perform incremental backups to a Version 3.7 or higher server in order to support a point-in-time restore. The server is only notified when files are deleted from a client file space or directory during an incremental backup.

The number of versions saved on the Tivoli Storage Manager server is determined by the server settings. For example, the server may be set to only allow three copies. Depending on the backup frequency, your point-in-time window could be anywhere from a day (assuming you backup once a day) to several days (assuming you backup up every other day).

A point-in-time restore will restore files deleted after the point-in-time date, but not files deleted before. Tivoli Storage Manager restores the versions from the most recent backup before the specified point-in-time. Ensure the point-in-time you specify is not the same as the time and date that a back up was performed.

Point-in-time overrides object condition so that even if an object has an active backup from a later date, the previous inactive copy is returned.

The point-in-time command line options, ***pitdate*** and ***pittime***, are used with the query and restore commands. For example, when ***pitdate*** and ***pittime*** are used with the **query backup** command, the date and time values specified in the ***pitdate*** and ***pittime*** parameters are used to establish the point-in-time for which file information is returned. When ***pitdate*** and ***pittime*** are used with the **restore** command, the date and time values specified in the ***pitdate*** and ***pittime*** parameters are used to establish the point-in-time for which files are returned. The ***pitdate*** and ***pittime*** values are mutually exclusive from the ***todate*** and ***totime*** parameters.

Using the Web Client to Restore Files

Your administrator determines how many backup versions Tivoli Storage Manager maintains for each file on your workstation. Frequently, the administrator maintains more than one version of each file. Having multiple versions of a file permits you to restore older versions in the event the most recent backup is damaged. Tivoli Storage Manager considers the most recent backup version to be the *active* version. Any other backup version is considered to be an *inactive* version. To restore a backup version that is inactive, you must display both active and inactive versions by clicking on **Display Active/Inactive Files** on the View menu. If you try to restore both an active and inactive version of a file at the same time, only the active version will be restored.

To restore your backup versions:

1. Click on **Restore** on the main window. The Restore by Tree window displays.
2. Expand the directory tree by clicking on the + sign. Click the selection boxes next to the object or objects you want to back up.
3. To modify specific restore options, click the **Options** button. Any options you change are effective during the current session *only*.
4. Click **Restore**. The Restore Destination window displays. Enter the appropriate information in the Restore Destination window.
5. Click **Restore**. The Restore Task List window displays the processing status.

Restoring Data from a Backup Set

Your Tivoli Storage Manager administrator can generate a backup set (a collection of your active files that reside on the server) onto portable media created on a device using a format that is compatible with the client device.

It is possible to generate a backup set as a number of special files if the device class the Tivoli Storage Manager administrator is *file*. These files can be stored locally (on client) to provide more restore flexibility for the client.

Portable media can be used on devices such as a CD-ROM, DVD, and Iomega JAZ or ZIP drives. Current device support information is available at the following Web site:

`http://www.tivoli.com/support/storage_mgr/requirements.html`

You can restore backup sets from the following locations:
- From portable media on a device attached to your client workstation
- Directly from the server

Backup sets can provide you with instant archive and rapid recovery capability as described below:

Instant Archive
This capability allows an administrator to create an archive collection from backup versions already stored on the server.

Rapid Recovery
When you are away from your office without a network connection and you lose data, you can restore the data from the backup set.

Notes:

1. If you cannot restore a backup set from portable media, check with your Tivoli Storage Manager administrator to ensure that the portable media was created on a device using a format that is compatible with your device.
2. There is no support in the Tivoli Storage Manager API for the backup set format.

Restoring an Entire or Partial Backup Set

Tivoli Storage Manager considers a backup set as one object containing the whole file structure. You can restore the entire backup set or just select portions. The backup set media is self-describing and contains all the information required to perform a successful restore.

The command line can be used to restore an entire backup set or individual files within a backup set. See "Restore Backupset" on page 216 for information on how to use the **restore backupset** command.

Restoring Files: Additional Topics

This section discusses additional topics related to performing restores. You do not need to understand this information in order to use Tivoli Storage Manager for basic tasks.

Authorizing Another Client Node to Restore or Retrieve Your Files

You can authorize another client node to restore your backup versions or retrieve your archive copies.

To authorize another node to restore or retrieve your files, use the **set access** command. You can also use the **query access** command to see your current list, and **delete access** to delete nodes from the list.

For more information on the commands, see:
- "Set Access" on page 223
- "Query Access" on page 200
- "Delete Access" on page 189

The Tivoli Storage Manager node you are authorizing must be registered with your Tivoli Storage Manager server.

Restoring or Retrieving Files from Another Client Node

If you want to restore files backed up or retrieve files archived by another NetWare client node, then you need access to those files as described in "Authorizing Another Client Node to Restore or Retrieve Your Files".

If you are granted access to files backed up by a different client node, you can restore those files by using the ***fromnode*** option with the **restore** command. For example, you could enter the following:

```
load dsmc res -fromnode=nw2 servb\sys:home/proj/* serva\sys:home/proj/
```

where **nw2** is the node name for another NetWare server, **servb\sys:home/proj/*** indicates the name of the server and the files you want to restore, and **serva\sys:home/proj/** indicates where you want to place the files you are restoring. You must specify a destination, or Tivoli Storage Manager attempts to restore the files to the server from which the files were backed up.

You can retrieve archived files in the same way, using the **retrieve** command.

For more information about the ***fromnode*** option, see "Fromnode" on page 162.

For more information about using the ***fromnode*** option with the **restore** command, see "Restore" on page 214.

Restoring or Retrieving Your Files to Another Client Node

Tivoli Storage Manager lets you restore files you backed up or retrieve files you archived from your own NetWare server when you are using a different NetWare server. You must enter your node name, because your backups and archives are stored according to your node, not your specific machine. Your Tivoli Storage Manager password protects your data.

To restore or retrieve files to another NetWare server, use the ***nodename*** option to specify the node name of the NetWare server from which you backed up or archived the files. You can either use the ***nodename*** option when starting Tivoli Storage Manager or update the client options file on the NetWare server. (If you are using someone else's machine, you can avoid changing their configuration by using the ***nodename*** option on the **load dsmc** command.)

For example, enter the following:

```
load dsmc res -nodename=nw1 serva\sys:home/proj/* servb\sys:home/proj/
```

where **nw1** is the node name for the NetWare server from which you backed up the files, **serva\sys:home/proj/*** identifies the server and the files you want to restore, and **servb\sys:home/proj/** indicates where you want to place the files you are restoring. You must specify a destination, or Tivoli Storage Manager attempts to restore the files to the node from which the files were backed up.

You can enter the ***password*** option with the **restore** or **retrieve** command, or allow Tivoli Storage Manager to prompt you for the password for the client node you specified with the ***nodename*** option.

Restoring a Disk In Case of Disk Loss

Tivoli Storage Manager can only recover your files if you can run the client. If the disk that contains the client is lost, you must reinstall the client before you can recover your files. If you also lose the disk that contains the operating system and communication software, you must recover them before you can connect to the server.

Note: Data can be restored from a backup set stored on local drives or portable media without setting up communication with server. See "Restoring Data from a Backup Set" on page 46 for more information about backup sets.

To protect yourself against these kinds of losses, put together a set of diskettes that you can use to restore your system to a state that permits you to contact the server and begin recovering data. These diskettes should contain:

1. A bootable operating system that permits you to perform basic functions.
2. A correctly configured communication program that will allow you to establish communications with the server.
3. A client with an appropriately customized options file.

The exact files you need differ depending on the communication package you use. Consult your operating system and communication software manuals for help in setting up these diskettes

Deleting File Spaces

If your administrator gives you backdelete authority, you can delete entire file spaces from the server. When you delete a file space, you delete all the files, both backup versions and archive copies, that are contained within the file space.

Carefully consider what you are doing before you attempt to delete a file space.

You cannot delete individual backup versions kept on the server.

If you decide you do not need the file space, use the **delete file space** command. See "Delete Filespace" on page 191 for more information.

Chapter 6. Archiving and Retrieving Files

Archiving and retrieving files is similar to backing up and restoring files. Many of the concepts are similar. In this chapter, we cover the main archive and retrieve tasks, but where concepts are the same as for backup and restore, we provide references to Chapter 4, "Backing Up Your Data" on page 27. See "Do You Want to Back Up or Archive Files?" on page 28 for a discussion of the difference between backups and archives.

This chapter provides instructions for the following tasks:

Table 12. Archiving and Retrieving Files

Task	Page
Performing Command Line Backups	49
Using the Web Client to Archive Data	50
Deleting Archived Files	51
Requesting Archive Services for Remote Servers	51
Performing Command Line Retrieves	51
Using the Web Client to Retrieve Data	52

Understanding How Your Archives Are Managed

When archiving files, Tivoli Storage Manager checks the ***include*** options in your include-exclude list to determine which management class to assign to the files. If you do not specifically assign a management class to a file with an ***include*** option, Tivoli Storage Manager assigns the file the default management class.

Tivoli Storage Manager can only archive a file if the selected management class contains an archive copy group.

For information on the various management class attributes used to manage your archives, see "Displaying Information about Management Classes and Copy Groups" on page 60. For information on assigning management classes, see "Assigning a Management Class to Files" on page 64.

Performing Command Line Backups

You request archive services when you want to preserve copies of files in their current state, either for later use or for historical or legal purposes. You can archive a single file, a group of files, or all the files in a directory or subdirectory. After you archive a file, you can choose to erase the original file.

In addition, Tivoli Storage Manager stores trustee directory rights, trustee file assignments, file attributes, name spaces, and associated name space information with the archive copies of the files.

Use the **archive** command to archive files. Use wildcards to archive more than one file at a time. If you archive a directory of files, you can use the ***subdir***=*yes* option to include all the subdirectories under that directory in the archive.

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For example, to archive the files in the **sys:proj** directory and its subdirectories, use:

```
load dsmc archive sys:proj/  -subdir=yes
```

You can use more than one file specification with the **archive** command. For example, to archive the **sys:proj/h1.doc** file and the **sys:h2.doc** file, use:

```
load dsmc archive sys:proj/h1.doc sys:h2.doc
```

Use the ***description*** option to assign a description to the archive:

```
load dsmc archive sys:h1.doc -description="Chapter 1, first version"
```

See "Displaying Backup Processing Status" on page 36 for an explanation of the statistics that Tivoli Storage Manager provides after processing an **incremental**, **selective** or **archive** command.

Use the ***archmc*** option to specify a different management class than the one normally associated with the file.

Using the V2 Archive Option

The ***v2archive*** option can be used with the **archive** command to archive only files to the server. Directories that exist in the path of the source file specification are not processed.

This option differs from the ***filesonly*** option in that the ***filesonly*** option archives the directories that exist in the path of the source file specification.

This option is not persistent and must be explicitly specified in each **archive** command.

Note: The ***v2archive*** option should not be used when archiving the NDS.

For more information, see "V2archive" on page 179

If Tivoli Storage Manager does not archive the file, check to see if it is marked for execute only or if it is opened and locked by another user.

Your administrator might have set up schedules to automatically archive certain files on your NetWare server. See Chapter 7, "Automating Tasks" on page 53 for information on checking and running the schedules available to you.

See "Archive" on page 187 for more information.

Using the Web Client to Archive Data

You can use Tivoli Storage Manager to archive specific files, a group of files with similar names, or entire directories. You can also assign a unique description for each group of files you archive (archive package). If you have the Web client started on your workstation, you can archive your data using the Web client backup-archive GUI. See "Starting a Web Client Session" on page 20 for information on starting the Web client.

To archive your files using the Web client backup-archive GUI:

1. Click the **Archive** button from the main window. The Archive window appears.

2. Expand the directory tree by clicking on the + sign. Click the selection boxes next to the files or directories you want to archive.
3. Enter a description, accept the default description, or select an existing description for your archive package in the **Description** pull down box.
4. To modify specific archive options, click the **Override Archive Options** button located to the right of the **Estimate** button. Any options you change are effective during the current session *only*. To estimate the transfer time for your archive selections click the **Estimate** button.
5. Click the **Archive** button. The Archive Status window displays the progress of the archive.

Considerations

- Select **File details** on the **View** menu to display file attributes for any file.
- The following functions are not supported on the Web client:
  - Estimate
  - View Policy Information
  - Access Another User
  - Searching and Filtering
  - User Access List
  - Preferences Editor

Archiving Files: Advanced Considerations

This section discusses some advanced considerations for archiving files. You do not need to use this information when performing basic archive tasks.

Deleting Archived Files

You can delete archives if you decide you no longer need them. Archives can be deleted if your node has archive delete authority (default setting). Unlike backup versions, you can delete individual archives, files, or directories from archives without deleting the entire file space.

Use the **delete archive** command to delete archive copies.

Requesting Archive Services for Remote Servers

You can request archive services for multiple NetWare file servers. See "Requesting Backup and Archive Services for Remote Servers" on page 39 for more information.

Performing Command Line Retrieves

You *retrieve* a file when you want to return an archive copy from the server to your NetWare server.

You can retrieve a single file, a group of files, or all the files in a directory or subdirectory. When you retrieve a file, Tivoli Storage Manager sends you a copy of that file. The archived file remains in storage.

You can also specify that you want to retrieve files you archived within a particular range of dates or that are due to expire within a particular range of dates.

Use the **retrieve** command to retrieve files. Indicate the file you want retrieved and a destination. If you do not indicate a destination, the files are retrieved to their original location.

For example, to retrieve the **sys:doc/h1.doc** file to its original directory, use:

```
load dsmc retrieve sys:/doc/h1.doc
```

To retrieve it under a new name, use:

```
load dsmc retrieve sys:doc/h1.doc sys:doc/h2.doc
```

You can use the pick option to get a list of archives from which you can pick files.

See "Retrieve" on page 218 for more information.

Using the Web Client to Retrieve Data

You can use Tivoli Storage Manager Web client to retrieve archive copies of specific files or entire directories as follows:

1. Click the **Retrieve** button from the main window. The Retrieve window appears.
2. Expand the directory tree by clicking on the **+** sign. Click the selection boxes next to the files or directories you want to retrieve.
3. Click **Retrieve**. The Retrieve Destination window appears. Enter the appropriate information in the Retrieve Destination window.
4. To modify specific retrieve options, click the **Retrieve Options** button located to the right of the **Estimate** button. Any options you change are effective during the current session *only*.
5. Click **Retrieve**. The Retrieve Status window displays the processing status.

Chapter 7. Automating Tasks

Your administrator can schedule Tivoli Storage Manager to perform tasks automatically on a regular basis. For example, you can automatically back up files at the end of each day or archive some of your files every Friday. This procedure, known as *central scheduling*, is a cooperative effort between the server and your client node. Your administrator associates clients with one or more schedules that are part of the policy domain maintained in the server database. The administrator defines central scheduling on the server and you start the client scheduler on your workstation. Once you start the client scheduler, further intervention is not necessary.

With client scheduling, you can also:
- Display information about available schedules.
- Display information about work that the schedule has completed.
- Modify scheduling options in the client options file.

Notes:

1. The schedule start time is based on the server's local time, not the workstation's.
2. Install the command line client and ensure the communication software is running before you start the client scheduler.

Specifying Scheduling Options

You can modify scheduling options in the client options file `dsm.opt` or in the graphical user interface. However, if your administrator specifies a value for these options, that value overrides the value in your client.

For more information about scheduling options, changing the scheduling mode, specifying the TCP/IP address or port number, or running commands before or after a schedule, see "Scheduling Options" on page 72.

Return Codes from the Command Line Interface

Earlier versions of the backup-archive client did not exit with consistent, documented return codes. This made automation with scripts, batch files, or other scheduling facilities difficult, since there was no easy means of accurately determining the success or failure of the client operation.

The backup-archive command line interface now exits with a return code that accurately reflects the success or failure of the client operation. Users who already have scripts, batch files, or other scheduling or automation facilities that interpret the return code from the command line interface may need to make changes in order to accommodate these new return codes.

In general, the return code is related to the highest severity message during the client operation.
- If the highest severity message is informational (ANSnnnnI), then the return code will be 0.
- If the highest severity message is a warning (ANSnnnnW), then the return code will be 8.

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- If the highest severity message is an error (ANSnnnnE), then the return code will be 12.

The exception to the above rules are warning or error messages that individual files could not be processed. For such a skipped file, the return code will be 4. For cases where the return code is not 0, you can examine the dsmerror.log file (and, for scheduled events, the dsmsched.log file).

For a description of the return codes and their meanings, see Table 13

Table 13. Return Codes and Meanings

Code	Explanation
0	All operations completed successfully.
4	The operation completed successfully, but some files were not processed. There were no other errors or warnings. This return code is very common. Files are not processed for various reasons. The most common reasons are: • The file is in an exclude list.. • The file was in use by another application and could not be accessed by the client • The file changed during the operation to an extent prohibited by the copy serialization attribute. See "Copy Serialization" on page 62.
8	The operation completed with at least one warning message. For scheduled events, the status will be "Completed". Review dsmerror.log (and dsmsched.log for scheduled events) to determine what warning messages were issued and to assess their impact on the operation.
12	The operation completed with at least one error message (except for error messages for skipped files). For scheduled events, the status will be "Failed". Review dsmerror.log (and dsmsched.log for scheduled events) to determine what error messages were issued and to assess their impact on the operation. As a general rule, this return code means that the error was severe enough to prevent the successful completion of the operation. For example, an error that prevents an entire drive from being processed yields return code 12. When a file is not found the operation yields return code 12.

The return code for a client macro will be the highest return code issued among the individual commands that comprise the macro. For example, suppose a macro consists of these commands:

```
SELECTIVE  C:\MyTools\* -SUBDIR=YES
INCREMENTAL  C:\MyPrograms\TestODBCDriver\* -SUBDIR=YES
ARCHIVE  E:\TSM510C\* -SUBDIR=YES
```

If the first command completes with return code 0; the second command completes with return code 8; and the third command completes with return code 4, the return code for the macro will be 8.

Managing the Client Scheduler Using the Client Acceptor Daemon (Recommended Method)

The Tivoli Storage Manager Client Acceptor daemon can manage the scheduler, reducing the number of background processes on your workstation. This also resolves memory retention problems that may occur when using manual methods of running the scheduler. We strongly recommend that you use the Client Acceptor daemon to manage the Client Scheduler. Do not use the Client Acceptor daemon while the **schedule** command is in use.

Use the ***managedservices*** option in your client options file to specify whether the Client Acceptor daemon manages the scheduler. See "Managedservices" on page 102 for more information.

Configuring the CAD to Manage the Scheduler

Perform the following steps to configure the CAD to manage the client scheduler:

1. Install the Web client. See "Installing and Using the Web Client" on page 22 for more information.
2. Edit the dsm.opt file and add this option:

   ```
   managedservices schedule webclient
   ```

   If you do not want to run the Web client specify:

   ```
   managedservices schedule
   ```
3. Start the Client Acceptor. See "Installing and Using the Web Client" on page 22 for more information.

Starting the Client Scheduler

To start the client scheduler on your client node and connect to the server schedule, change to the Tivoli Storage Manager installation directory and enter the following command:

```
load dsmc schedule
```

When you start the client scheduler, it runs continuously until you end the process, log off your system, or enter this command at the NetWare console prompt:

```
unload dsmc
```

You can also include the **schedule** command in your `autoexec.ncf` file so that every time you start NetWare, the client scheduler starts.

Tape prompting does not occur during a scheduled event regardless of the ***tapeprompt*** option setting in your options file.

It is strongly recommended that you use the Client Acceptor daemon to manage the Client Scheduler. Do not use the Client Acceptor daemon while the **schedule** command is in use. See "Managing the Client Scheduler Using the Client Acceptor Daemon (Recommended Method)" for more information.

Displaying Information about Scheduled Work

To view schedules that are defined for your client node, enter:

```
load dsmc query schedule
```

Tivoli Storage Manager displays detailed information about all scheduled work for your client node. The figure below displays sample **query schedule** output.

```
 Schedule Name: DAILY_INC
   Description: Daily System-wide backup
        Action: Incremental
       Options: QUIET
       Objects:
      Priority: 1
Next Execution: 30 minutes
      Duration: 4 Hours
        Period: 1 Day
   Day of Week: Any
        Expire: Never

 Schedule Name: WEEKLY_INC
   Description: Weekly backup for project files
        Action: Incremental
       Options: QUIET
       Objects: NDS NDS:
      Priority: 1
Next Execution: 60 minutes
      Duration: 8 Hours
        Period: 7 Days
   Day of Week: Friday
        Expire: Never
```

Figure 1. Sample Query Schedule Output

The schedule name, **DAILY_INC**, starts a daily incremental backup. The next incremental backup will start in 30 minutes. Because no objects are listed, Tivoli Storage Manager runs the incremental backup on your default domain. The schedule has no expiration date.

The schedule name, **WEEKLY_INC**, starts a weekly incremental backup on the **NDS** and `NDS:` volumes.

Displaying Information about Completed Work

When you run the **schedule** command in the foreground, your screen displays output from the scheduled commands. Output is also directed to the dsmsched.log file in the installation directory unless you change the directory and file name using the ***schedlogname*** option.

After scheduled work is performed, check the schedule log to verify that all work completed successfully.

When a scheduled command is processed the schedule log may contain the following entry:

```
Scheduled event eventname completed successfully
```

The client indicates whether Tivoli Storage Manager successfully issued the scheduled command associated with the *eventname*. No attempt is made to determine the success or failure of the command. You can assess the status of the command by evaluating the return code from the scheduled command in the schedule log. The schedule log entry for the command's return code is prefaced with the following text:

```
Finished command. Return code is:
```

The schedule log continues to grow unless you prune it using the ***schedlogretention*** option. See "Specifying Scheduling Options" on page 53 for more information.

Enabling-Disabling Scheduled Commands

You can query the schedules defined by your Tivoli Storage Manager administrator by entering the following command:

```
query schedule
```

You can use the ***schedcmddisabled*** option to disable the scheduling of commands by the server. Commands are scheduled by using the ***action***=**command** option on the **define schedule** server command.

The ***schedcmddisabled*** option does not disable the ***preschedulecmd*** and ***postschedulecmd*** commands. However, you can specify ***preschedulecmd*** or ***postschedulecmd*** with a blank or a null string to disable the scheduling of these commands. See "Schedcmddisabled" on page 127 for more information.

Chapter 8. Understanding Storage Management Policies

Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. You can associate (or *bind*) your data to these policies; then when the data is backed up or archived, it is managed according to policy criteria. Policy criteria include a policy domain, a policy set, a copy group, and a management class.

Policies determine:
- Whether a file is eligible for backup or archive services.
- How many backup versions to keep.
- How long to keep inactive backup versions and archive copies.
- Where to place the copies in storage.

This chapter explains:
- Policy criteria (policy domains, policy sets, copy groups, and management classes).
- How to display policies.
- How Tivoli Storage Manager associates your data with policies.

Using Policy Domains and Policy Sets

A *policy domain* is a group of clients with similar requirements for backing up and archiving data. Policy domains contain one or more policy sets. An administrator uses policy domains to manage a group of client nodes in a logical way. For example, a policy domain might include:
- A department, such as Accounting.
- A physical location, such as a particular building or floor.
- A local area network, such as all clients associated with a particular file server.

Tivoli Storage Manager includes a default policy domain named *Standard*. At first, your client node might be associated with the default policy domain. However, your administrator can define additional policy domains if there are groups of users with unique backup and archive requirements.

A *policy set* is a group of one or more management classes. Each policy domain can hold many policy sets. The administrator uses a policy set to implement different management classes based on business and user needs. Only one of these policy sets can be active at a time. This is called the *active policy set*. Each policy set contains a *default management class* and any number of additional management classes.

Using Management Classes and Copy Groups

A *management class* is a collection of backup and archive copy groups that establishes and contains specific storage management requirements for backing up and archiving data. An administrator can establish separate management classes to meet the backup and archive requirements for different kinds of data, such as:
- System data that is critical for the business.
- Application data that changes frequently.
- Report data that Management reviews monthly.

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- Legal information that must be retained indefinitely, requiring a large amount of disk space.

Most of the work you do with storage management policies is with management classes. You must associate files, directories, and the NDS with appropriate management classes. If you do not associate a file or, the NDS with a management class, Tivoli Storage Manager uses the default management class in the active policy set. If you do not specify a management class for directories, Tivoli Storage Manager uses the management class in the active policy set with the largest *retain only* setting.

You can use ***include*** statements in your include-exclude list to associate files with management classes. See "Selecting a Management Class for Files" on page 63 for more information. In your client options file `dsm.opt` file, you can associate directories with a management class, using the ***dirmc*** option. See "Selecting a Management Class for Directories" on page 65 for more information. To associate the NDS with a management class, use an ***include*** statement in your include-exclude list. See "Selecting a Management Class for the NDS" on page 65 for more information.

Within a management class, the specific backup and archive requirements are in *copy groups*. Copy groups define the specific storage management attributes that describe how the server manages backed up or archived data. Copy groups include both *backup copy groups* and *archive copy groups*. A management class can have one backup copy group, one archive copy group, both, or neither.

A *backup copy group* contains attributes that are used during the backup process to determine:
- Whether a file that has changed since the last backup is backed up again.
- How many days must elapse before a file is backed up again.
- How a file is processed during a backup if it is in use.

It also contains attributes to manage the backup versions of your files on the server. These attributes control:
- Where the server stores backup versions of your files and directories.
- How many backup versions the server keeps of your files and directories.
- How long the server keeps backup versions of your files and directories.

An *archive copy group* contains attributes that control:
- Whether a file is archived if it is in use
- Where the server stores archived copies of your files
- How long the server keeps archived copies of your files

When the server is unable to rebind a file to an appropriate management class, the server uses one of two values to determine the number of days to retain the file. If it is a backup version, the server uses ***backup grace period retention***. If it is an archive copy, the server uses ***archive grace period retention***. For more information about grace periods, see "Using a Retention Grace Period" on page 67.

Displaying Information about Management Classes and Copy Groups

Use the ***detail*** option on the **query mgmtclass** command to view the available management classes.

Table 14 on page 61 shows the default values for the backup and archive copy groups in the standard management class. Each attribute is discussed in more

detail immediately following the table.

Table 14. Default Values in the Standard Management Class

Attribute	Backup Default	Archive Default
Copy group name	Standard	Standard
Copy type	Backup	Archive
Copy frequency	0 days	CMD (Command)
Versions data exists	Two versions	Does not apply
Versions data deleted	One version	Does not apply
Retain extra versions	30 days	Does not apply
Retain only version	60 days	Does not apply
Copy serialization	Shared static	Shared static
Copy mode	Modified	Absolute
Copy destination	Backuppool	Archivepool
Retain versions	Does not apply	365 days

Copy Group Name

The name of the copy group. The default value for both backup and archive is *Standard*.

Copy Type

The type of copy group. The value for backup is always *Backup*, and the value for archive is always *Archive*.

Copy Frequency

Copy frequency is the minimum number of days that must elapse between successive incremental backups. Use this attribute during a full incremental backup.

Copy frequency works with the *mode* parameter. For example, if frequency is *zero (0)* and mode is *modified*, a file or directory is backed up *only if* it changed since the last incremental backup. If frequency is *zero (0)* and mode is *absolute*, a file is backed up every time you run an incremental backup against it. This attribute is not checked for selective backups.

For archive copy groups, copy frequency is always CMD (command). There is no restriction on how often you archive a file.

Versions Data Exists

The *Versions Data Exists* attribute specifies the maximum number of different backup versions retained for files and directories currently on your file system. If you select a management class that permits more than one backup version, the most recent version is called the *active* version. All other versions are called *inactive* versions. If the maximum number of versions permitted is five, and you run a backup that creates a sixth version, the oldest version is deleted from server storage.

Versions Data Deleted

The *Versions Data Deleted* attribute specifies the maximum number of different backup versions retained for files and directories that you erased from your file system. This parameter is ignored as long as the file or directory remains in your file system.

If you erase the file or directory, the next time you run an incremental backup, the active backup version is changed to inactive and the oldest versions are erased that exceed the number specified by this parameter.

The expiration date for the remaining versions is based on the *retain extra versions* and *retain only version* parameters.

Retain Extra Versions

The *Retain Extra Versions* attribute specifies how many days all but the most recent backup version is retained. The most recent version is the active version, and active versions are never erased. If *Nolimit* is specified, extra backup versions are deleted based on the *versions data exists* or the *versions data deleted* parameter settings.

Retain Only Version

The *Retain Only Version* attribute specifies the number of days the last remaining inactive version of a file or directory is retained. If *Nolimit* is specified, the last version is retained indefinitely.

This parameter goes into effect during the next incremental backup after a file is deleted from the client machine. Any subsequent updates to this parameter will not affect files that are already inactive. For example: If this parameter is set to 10 days when a file is inactivated during an incremental backup, the file will be expired in 10 days.

Copy Serialization

The *Copy Serialization* attribute determines whether a file can be in use during a backup or archive, and what to do if it is. The value for this attribute can be one of the following:

- **Static**. A file or directory must not be modified during a backup or archive. If the object is changed during a backup or archive attempt, it is not backed up or archived.
- **Shared static**. A file or directory must not be modified during backup or archive. Tivoli Storage Manager attempts to perform a backup or archive as many as four additional times, depending on the value specified on the ***changingretries*** option in your client options file. If the object is changed during every backup or archive attempt, it is not backed up or archived.
- **Dynamic**. A file or directory is backed up or archived on the first attempt regardless of whether it changes during a backup or archive. However, if the open file has the share flag set to *Deny_Read*, the backup does not occur.
- **Shared dynamic**. A file or directory is backed up or archived regardless of whether it changes during a backup or archive. Tivoli Storage Manager attempts to perform a back up or archive as many as four additional times, depending on the value specified on the ***changingretries*** option in your client options file without the file changing during the attempt. The file is backed up or archived on the last try even if it has changed. However, if the open file has the share flag set to *Deny_Read*, the backup does not occur.

Note: Be careful when you select a management class containing a copy group that specifies shared dynamic or dynamic for serialization backup. If you select a management class that permits a file to be backed up or archived while it is in use, the backup version or archived copy stored on the server might be a fuzzy copy. A *fuzzy copy* is a backup version or archived copy that does not accurately reflect what is currently in the file. It might contain some, but not all, of the changes. If that is not acceptable, select a management class that creates a backup version or archive copy only if the file does not change during a backup or archive.

If you restore or retrieve a file that contains a fuzzy copy, the file might not be usable.

Copy Mode

The *Copy Mode* attribute determines whether a file or directory is considered for incremental backup regardless of whether it changed or not since the last backup. Tivoli Storage Manager does not check the mode for selective backups. The value for this parameter can be one of the following:

- **Modified.**The file is considered for incremental backup *only if* it has changed since the last backup. A file is considered changed if any of the following are true:
  The date or time of the last modification is different.
  The file size is different.
  The file attributes, with the exception of archive, are different. However, if only the file meta-data changes (such as access permissions), but the file data does not change, Tivoli Storage Manager may back up only the meta-data.
  The trustee rights are different.
- **Absolute.** The file is considered for incremental backup regardless of whether it changed since the last backup. For archive copy groups, the mode is always *absolute*, indicating that a file is archived regardless of whether it changed since the last archive request.

Copy Destination

Names the destination where backups or archives are stored. The destination can be either a storage pool of disk devices or a storage pool of devices that support removable media, such as tape.

Retain Versions

Specifies the number of days an archived file remains in storage. When the specified number of days elapse for an archived copy of a file, it is deleted from server storage.

Selecting a Management Class for Files

If the default management class meets the backup and archive requirements for all the files on your workstation, it is not necessary to take any action to associate your files with that management class. This is done automatically when you back up or archive your files.

Note: If you do not assign a management class to the NDS, the default management class is used.

When selecting a different management class for your files, consider these questions:

- Does the management class contain a backup copy group?

  If you attempt to back up a file associated with a management class that does not contain a backup copy group, the file is not backed up.
- Does the management class contain an archive copy group?

  If you attempt to archive a file associated with a management class that does not contain an archive copy group, the file is not archived.
- Does the backup copy group contain attributes that back up your files often enough?

  Mode and frequency work together to control how often a file is backed up when you use incremental backup. Tivoli Storage Manager does not check those attributes for selective backup.
- Do the copy groups specify either static or shared static for serialization?

  If serialization is shared dynamic or dynamic, you might get fuzzy backups or archive copies. Verify that this is acceptable. For example, you might want to use shared dynamic or dynamic serialization for a file to which log records are continuously added. If you used static or shared static serialization, the file might never back up because it is constantly in use. With shared dynamic or dynamic serialization, the file is backed up, but the backup version of the file might contain a truncated message. Do not use shared dynamic or dynamic serialization for a file if it is very important that the backup version or archive copy contain all changes.
- Does the backup copy group specify an adequate number of backup versions to keep, along with an adequate length of time to keep them?
- Does the archive copy group specify an adequate length of time to keep archived copies of files?

Assigning a Management Class to Files

A management class defines when your files are included in a backup, how long they are kept on the server, and how many versions of the file the server should keep. The server administrator selects a default management class. You can specify your own management class to override the default management class.

You can assign a management class for a file or file group by using an **include** statement in your client options file. Management class names are not case-sensitive. For example, to associate all the files in the `costs` directory with a management class named **budget**, you would enter:

```
include sys:adsm/proj2/costs/* budget
```

To specify a management class named **managall** to use for all files to which you do not explicitly assign a management class, you would enter:

```
include *:\...\*  managall
```

The example below demonstrates how to use a management class:

```
exclude *:...\*.sno
include nw5/sys:winter\...\*.ice mcweekly
include nw5/sys:winter\december\*.ice mcdaily
include nw5/sys:winter\january\*.ice  mcmonthly
include nw5/sys:winter\winter\white.sno
```

Processing follows these steps:

1. The file named `white.sno` is backed up following bottom-up processing rules. Because you did not specify a management class, the file is assigned to the default management class.

2. Any file with an extension of `ice` in the `nw5/sys:winter\january` directory is assigned to the management class, ***mcmonthly***.
3. Any file with an extension of `ice` in the `nw5/sys:winter\december` directory is assigned to the management class, ***mcdaily***.
4. Any other files with an extension of `ice` in any directory under `nw5\sys:winter` are assigned to the management class, ***mcweekly***.
5. Any file with an extension of `sno` (except `nw5/sys:winter\winter\white.sno`) in any directory is excluded from backup.

To specify your own default management class for files that are not explicitly included, specify:

```
include *:\...\* mgmt_class_name
```

as the first include or exclude option defined.

Overriding the Management Class for Archived Files

When you archive a file, you can override the assigned management class using the **archive** command with the ***archmc*** option to specify a different management class. For example, to associate the file, `budget.jan`, with the management class **ret2yrs**, you would enter:

```
load dsmc archive sys:plan\proj1\budget.jan -archmc=ret2yrs
```

Selecting a Management Class for the NDS

If you do not assign a management class to the NDS, the default management class is used. To assign a different management class to the NDS, use the same criteria that you use when assigning management classes to files. For example, you would enter:

```
include nw5\nds mgmtclname
```

where ***mgmtclname*** is the name of the management class. If you plan to back up *and* archive the NDS, select a management class with a backup copy group *and* an archive copy group.

The backup copy group in the management class must contain attributes that permit you to back up often and to keep as many different backup versions as you need. To verify that complete copies of the files are created when you request a backup or archive, select a management class that specifies static or shared static for serialization.

Selecting a Management Class for Directories

If the management class in your active policy set containing the longest retention period meets your backup requirements for directories, it is not necessary to take any action to associate directories with that management class. Tivoli Storage Manager does it automatically when it backs up your directories.

If the default management class does not meet your requirements, select a management class with an adequate retention period specified on the *retain only version* parameter. You should keep directories at least as long as you keep the files associated with those directories.

To assign a management class other than the default to directories, use the ***dirmc*** option in your client options file . For example, to assign a management class named **direct1** to your directories, you would enter:

```
dirmc direct1
```

Note: For archive operations, directories are assigned to a management class whose retention period meets or exceeds that of the files contained in those directories. The management class is rebound as needed to ensure that directories with files do not expire.

Binding and Rebinding Management Classes to Files

Binding associates a file with a management class. When you back up a file for the first time, Tivoli Storage Manager binds it to either the default management class or the management class specified in your include-exclude list. In later backups of the same file, if you change the management class, both active and inactive versions are bound again to the new management class.

If the backup copy group for the management class specifies keeping multiple backup versions of the file, and you request multiple backups, the server always has one active backup version (the current version) and one or more inactive backup versions of the file. All backup versions of a file are bound to the same management class and are managed based on the attributes in the backup copy group.

When you archive a file for the first time, Tivoli Storage Manager binds it to the default management class, to the management class specified in your include-exclude list, or to a management class you specify when modifying your archive options during an archive.

Archived files are never rebound to a different management class. If you change the management class for a file, any previous copies of the file that you archived remain bound to the management class specified when you archived them.

Rebinding Backup Versions of Files

Backups of files are bound again to a different management class in the following conditions. In each condition, the files (active and inactive) are not bound again until the next backup.

- You specify a different management class in an Include statement to change the management class for the file. The backups are managed based on the old management class until you run another backup.
- Your administrator deletes the management class from your active policy set. The default management class is used to manage the backup versions when you back up the file again.
- Your administrator assigns your client node to a different policy domain and the active policy set in that domain does not have a management class with the same name. The default management class for the new policy domain is used to manage the backup versions.

Using a Retention Grace Period

Tivoli Storage Manager also provides a *backup retention grace period* and an *archive retention grace period* to help protect your backup and archive data when it is unable to rebind a file to an appropriate management class. The backup retention grace period is used when:

- You change the management class for a file, but neither the default management class nor the new management class contain a backup copy group.
- The management class to which a file is bound no longer exists, and the default management class does not contain a backup copy group.

The backup retention grace period, defined in your policy domain, starts when you run an incremental backup. The default is 30 days. However, your administrator can lengthen or shorten this period.

When Tivoli Storage Manager manages a file using the backup retention grace period, it does not create any new backup versions of the file. All existing backup versions of the file expire 30 days (or the number of days specified in your policy domain) from the day they are marked inactive.

For archived files, if the management class to which a file is bound no longer exists, and the default management class does not contain an archive copy group, the archive retention grace period defined in your policy domain is used. The default retention period is 60 days. However, your administrator can lengthen or shorten this period.

Chapter 9. Using Processing Options

You can use defaults for processing options or you can tailor the processing options to meet specific needs. This chapter:
- Provides an overview of processing options.
- Includes an options reference section that provides detailed information about each option.

As a quick reference, this chapter includes instructions for the following tasks:

Task	Page
Entering Options with a Command	76
Using Options with Commands	75

Overview of Processing Options

Tivoli Storage Manager uses *processing options* that you specify in your client options file (`dsm.opt`) to control communications, backup-archive processing, and other types of processing.

This section provides an overview of the following types of options that you can enter in your client options file (dsm.opt):
- Communication options
- Backup and archive processing options
- Restore and retrieve processing options
- Scheduling options
- Format and language options
- Command processing options
- Authorization options
- Error processing options
- Transaction processing option
- Web client options

See Chapter 2, “Configuring IBM Tivoli Storage Manager” on page 5 for information on how to create and modify your `dsm.opt` file.

Communication Options

You use communication options to specify how your client node communicates with a Tivoli Storage Manager server.

For NetWare use the TCP/IP communication protocol.

Use the ***commmethod*** option to specify the communication protocol. For more information, see “Commmethod” on page 79.

Ask your Tivoli Storage Manager administrator for assistance in setting your communication options.

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TCP/IP Options

To use the TCP/IP communication protocol, you must include the ***tcpserveraddress*** option in your client options file. The other TCP/IP options have default values which you can modify only if you want to change the default value.

Table 15. TCP/IP Options

Option	Description	Page
httpport	Specifies a TCP/IP port address for the Tivoli Storage Manager Web client.	96
tcpbuffsize	Specifies the size, in kilobytes, of the Tivoli Storage Manager internal TCP/IP communication buffer.	137
tcpport	Specifies the TCP/IP port address for a Tivoli Storage Manager server.	140
tcpserveraddress	Specifies the TCP/IP address for a Tivoli Storage Manager server.	141
tcpwindowsize	Specifies the size, in kilobytes, of the TCP/IP sliding window for your client node.	142
webports	Enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Client Acceptor service and the Web Client Agent service for communications with the Web GUI.	147

Node Option

Use the following options to specify the client node for which to request backup-archive services.

Table 16. Node Options

Option	Description	Page
nodename	Specifies the name of your workstation so that you can establish communications with the Tivoli Storage Manager server.	106
virtualnodename	Specifies the name of another client node. Use this option if you want to restore or retrieve your files from a Tivoli Storage Manager server to a client node other than the one on which you stored files without storing your password in the registry.	146

Backup and Archive Processing Options

You can use the following options to control some aspects of backup and archive processing.

Table 17. Backup and Archive Processing Options

Option	Description	Page
changingretries	Specifies the number of retries when attempting to back up or archive a file that is in use.	78
compressalways	Specifies whether to continue compressing an object if it grows during compression, or resend the object uncompressed. This option is used with the ***compression*** option.	82

Table 17. Backup and Archive Processing Options (continued)

Option	Description	Page
compression	Specifies whether to compress files before sending them to the server.	83
dirmc	Specifies the management class to use for directories. If not specified, Tivoli Storage Manager uses the management class with the longest retention period.	86
domain	Specifies the volumes to include in your default client domain for an incremental backup.	87
exclude ***exclude.backup*** ***exclude.file*** ***exclude.file.backup***	*These options are equivalent*. Use these options to exclude a file or group of files from backup services.	93
exclude.archive	Excludes a file or group of files from archive services.	93
exclude.compression	Excludes files from compression processing if ***compression***=*yes* is specified. This option applies to backups and archives.	93
exclude.dir	Excludes the directory you specify, its files, and all its subdirectories and their files from backup processing.	93
exclude.encrypt	Excludes specified files from encryption processing.	93
inclexcl	Specifies the path and file name of an include-exclude options file.	97
include ***include.backup*** ***include.file***	*These options are equivalent*. Use these options to include files or assign management classes for backup processing.	98
include.archive	Includes files or assigns management classes for archive processing.	98
include.compression	Includes files for compression processing if you specify ***compression***=*yes*. This option applies to backups and archives.	98
include.encrypt	Includes specified files for encryption processing.	98
memoryefficientbackup	Specifies a memory-saving backup algorithm for incremental backups when used with the **incremental** command.	105
nwignorecompressbit	Specifies whether you want to ignore the setting of the *compressed file (Co)* attribute during selection processing for incremental backups.	108
subdir	Specifies whether to include subdirectories of a named directory.	134
tapeprompt	Specifies whether you want Tivoli Storage Manager to wait for a tape required for a backup or archive to be mounted, or whether to prompt you for your choice.	136

Restore and Retrieve Processing Options

The following options relate to restore and retrieve processing.

Table 18. Restore and Retrieve Processing Options

Option	Description	Page
replace	Specifies whether to overwrite an existing file, or to prompt you for your selection when you restore or retrieve files.	122
subdir	Specifies whether you want to include subdirectories of a named directory.	134
tapeprompt	Specifies whether you want Tivoli Storage Manager to wait for a tape required for a restore or retrieve to be mounted, or to prompt you for your choice.	136

Scheduling Options

You can use the following options to regulate central scheduling. Tivoli Storage Manager uses scheduling options only when the Scheduler is running.

Table 19. Scheduling Options

Option	Description	Page
managedservices	Specifies the services to be managed by the Tivoli Storage Manager Client Acceptor.	102
maxcmdretries	Specifies the maximum number of times the client scheduler attempts to process a scheduled command that fails.	104
postschedulecmd	Specifies a command to process after running a schedule.	117
preschedulecmd	Specifies a command to process before running a schedule.	118
queryschedperiod	Specifies the number of hours the client scheduler waits between unsuccessful attempts to contact the server for scheduled work.	120
retryperiod	Specifies the number of minutes the client scheduler waits between attempts to process a scheduled command that fails or between unsuccessful attempts to report results to the server.	125
schedcmddisabled	Specifies whether to disable the scheduling of generic commands specified by your Tivoli Storage Manager administrator.	127
schedlogname	Specifies the name of the file where schedule log information is stored.	128
schedlogretention	Specifies the number of days to keep log file entries in the schedule log, and whether to save pruned entries.	129
schedmode	Specifies which schedule mode to use, *polling* or *prompted*.	130

Table 19. Scheduling Options (continued)

Option	Description	Page
tcpclientaddress	Specifies the TCP/IP address of your client node. Use this option only with the **schedule** command when you specify *prompted* as the schedule mode.	138
tcpclientport	Specifies the TCP/IP port number of your client node. Use this option only with the **schedule** command when you specify *prompted* as the schedule mode.	139

Format and Language Options

You can use the following options to select different formats for date, time, numbers, and for different languages if you have the appropriate client installed for that language.

Table 20. Format and Language Options

Option	Description	Page
dateformat	Specifies the format for displaying dates.	85
language	Specifies the language used for messages.	100
numberformat	Specifies the format for displaying numbers.	107
timeformat	Specifies the format for displaying time.	143

Command Processing Options

The following options apply when you use Tivoli Storage Manager commands.

Table 21. Command Processing Options

Option	Description	Page
editor	Specifies if the command-line interface editor and command retrieve capability is turned on or off.	89
quiet	Specifies that processing information does not display on your screen. This option can be overidden by the server.	121
scrolllines	Specifies the number of lines to display at one time when displaying a list of items. Use this option only when ***scrollprompt*** is set to *yes*.	132
scrollprompt	Specifies whether Tivoli Storage Manager stops after displaying the number of lines specified by ***scrolllines***, or it scrolls to the end of the list.	133
verbose	Specifies that processing information should display on your screen. The alternative is ***quiet***. This option can be overridden by the server.	145

Authorization Options

These options control access to a Tivoli Storage Manager server.

Table 22. Authorization Options

Option	Description	Reference
encryptkey	Specifies whether to save the encryption key locally or whether to prompt the user for the encryption key.	90
nwpwfile	Specifies whether to encrypt and save a NetWare user's ID and password to the TSM.PWD file.	109
nwuser	Specifies a user ID and password to connect to a NetWare server when you start a session.	110
password	Specifies a Tivoli Storage Manager password.	113
passwordaccess	Specifies how Tivoli Storage Manager handles a password if one is required for your workstation.	114
passworddir	Specifies the directory in which you want to store the automatically generated password for your client node. The encryption key and password are encrypted and stored in the `TSM.PWD` file.	116
revokeremoteaccess	Restricts an administrator with client access privileges from accessing your workstation through the Web client.	126

Error Processing Options

These options specify the name of the error log file and how Tivoli Storage Manager treats the entries in the log file.

Table 23. Error Processing Options

Option	Description	Page
errorlogname	Specifies the path and name of the error log.	91
errorlogretention	Specifies the number of days to keep log file entries in the error log, and whether to save pruned entries.	92
nwwaitonerror	Specifies whether an error message is displayed if an error occurs while exiting a session. If this option is set to *no*, the window closes automatically, and the client program returns to the NetWare console.	112

Transaction Processing Options

These options control how Tivoli Storage Manager processes transactions between the client and server.

Table 24. Transaction Processing Options

Option	Description	Page
commrestartduration	Specifies the maximum number of minutes you want the client to try to reconnect to a Tivoli Storage Manager server after a communication error occurs.	80
commrestartinterval	Specifies the number of seconds you want the client to wait between attempts to reconnect to a Tivoli Storage Manager server after a communication error occurs.	81
largecommbuffers	Specifies whether the client will use increased buffers to transfer large amounts of data between the client and the server.	101
resourceutilization	Specifies a threshold (between 1 and 10) for the maximum number of sessions opened between the Tivoli Storage Manager server and client during processing.	123
txnbytelimit	Specifies the number of kilobytes Tivoli Storage Manager can buffer together in a transaction before sending data to the server.	144

Web Client Options

The following are options for the Tivoli Storage Manager Web Client.

Table 25. Web Client Options

Option	Description	Page
httpport	Specifies a TCP/IP port address for the Web client.	96
managedservices	Specifies whether the Tivoli Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.	102
revokeremoteaccess	Restricts administrator access on a client workstation through the Web client.	126
webports	Enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Tivoli Storage Manager Client Acceptor service and the Web Client Agent service for communications with the Web GUI.	147

Using Options with Commands

You can override some of the options in your options file by entering them with appropriate backup-archive commands.

Options are processed in the following order (precedence):

1. Options defined on the server with server-enforced client options. The server overrides client values.

2. Options entered locally on the command line.
3. Options defined on the server for a schedule using the options parameters.
4. Options entered locally in the options file.
5. Options received from the server with client options not enforced by the server. The server *does not* override client values.
6. Default option values.

Tivoli Storage Manager also includes a group of client command options that you can enter *only* on the command line with specific commands. For a complete list of command line options, a description, and where to go in this book for more information, see Chapter 10, "Using Options with Commands" on page 149.

To use an option with a command, enter a dash (–), the option name, an equal sign (=), and the option parameters. For example,

```
dsmc incremental -domain=sys:
```

For options that do not include parameters, enter a dash (–) and the option name. For example,

```
dsmc incremental -quiet
```

Note: Use a leading dash (-) to indicate that the following text is the name of an option. If an object name begins with a dash, you must surround it in either single quotes (') or double quotes ("). Most operating system command line processors strip the quotes before submitting the command line arguments to the Tivoli Storage Manager client application. In such cases, using escape characters or doubling the quotes allows the client to receive the quoted object name. In loop mode, surround such objects in either single quotes (') or double quotes (").

You can enter the entire option name or its abbreviation. For information about how to read the syntax diagrams, see "Reading Syntax Diagrams" on page xii.

Entering Options with a Command

Follow these general rules to enter options with a command:

- Enter options before or after command parameters. For example, you can enter the ***subdir*** option before or after a file specification:

  ```
  dsmc selective -subdir=yes sys:usr/home/proj1/*
  dsmc selective sys:usr/home/proj1/* -subdir=yes
  ```

- When entering several options on a command, separate each with a blank space.
- Enclose the value in quotes (" ") if the option value that you enter contains a blank space. For example,

  ```
  dsmc archive -description="Project A" "sys:usr/home/proj1/*"
  ```

- Any option that you enter on the command line, with the exception of ***domain***, overrides the value set in the client options file. When you use the ***domain*** option with the **incremental** command, it adds to the domain specified in your client options file rather than overriding the current value.
- The maximum number of characters for a file name is 256. The maximum combined length of the file name and path name is 512 characters.

Client Options Reference

The following sections contain detailed information about each of the Tivoli Storage Manager processing options. Information for each option includes:

- A description of the option.
- A syntax diagram of the option. The option name contains uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the option name. See "Reading Syntax Diagrams" on page xii for an explanation of these diagrams.
- Detailed descriptions of the option parameters. If the parameter is a constant (a value that does not change), use the minimum abbreviation.
- Examples of using the option in the client options file.
- Examples of using the option on the command line (if applicable). Options with a command line example of **Does not apply** cannot be used with command line or scheduled commands.

Note: For options with a **yes** parameter, acceptable alternatives are **1**, **true**, and **on**. For options with a **no** parameter, acceptable alternatives are **0**, **false**, and **off**.

Changingretries

The ***changingretries*** option specifies how many additional times you want the client to attempt to back up or archive a file that is in use. Use this option with the **archive**, **incremental**, and **selective** commands.

Use this option only when *serialization*, an attribute in a management class copy group, is *shared static* or *shared dynamic*.

With *shared static* serialization, if a file is open during an operation, the operation repeats the number of times that you specify. If the file is open during each attempt, the operation does not complete.

With *shared dynamic* serialization, if a file is open during an operation, the operation repeats the number of times that you specify. The backup or archive occurs during the last attempt whether the file is open or not.

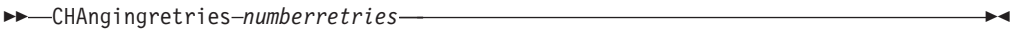
If the open file has the share flag set to ***deny_read***, the client program cannot back it up.

Notes:
1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

numberretries
Specifies the number of times a backup or archive operation is attempted if the file is in use. The range of values is zero through 4; the default is 4.

Examples

Options file:

```
changingretries 3
```

Command line:

```
-cha=0
```

Commmethod

The ***commmethod*** option specifies the communication method you use to provide connectivity for client-server communication.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

TCPip
The Transmission Control Protocol/Internet Protocol (TCP/IP) communication method.

Examples

Options file:

```
commm tcp
```

Command line:

```
-commmethod=tcp
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Commrestartduration

The ***commrestartduration*** option specifies the maximum number of minutes you want the client to attempt to reconnect with a server after a communication error occurs.

Note: A scheduled event will continue if the client reconnects with the server before the ***commrestartduration*** value elapses, even if the event's startup window has elapsed.

You can use the ***commrestartduration*** option and the ***commrestartinterval*** in busy or unstable network environments to decrease connection failures.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

minutes
The maximum number of minutes you want the client to attempt to reconnect with a server after a communication failure occurs. The range of values is zero through 9999; the default is 60.

Examples

Options file:

```
commrestartduration 90
```

Command line:

```
Does not apply.
```

Commrestartinterval

The ***commrestartinterval*** option specifies the number of seconds you want the client to wait between attempts to reconnect with a server after a communication error occurs.

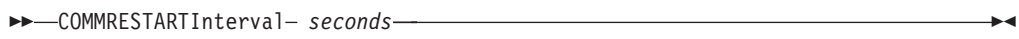
Note: Use this option only when ***commrestartduration*** is a value greater than zero.

You can use the ***commrestartduration*** option and the ***commrestartinterval*** in busy or unstable network environments to decrease connection failures.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

seconds
The number of seconds you want the client to wait between attempts to reconnect with a server after a communication failure occurs. The range of values is zero through 65535; the default is 15.

Examples

Options file:

```
commrestartinterval 30
```

Command line:

```
Does not apply.
```

Compressalways

The ***compressalways*** option specifies whether to continue compressing an object if it grows during compression, or resend the object uncompressed. Use this option with the ***compression*** option.

Use the ***compressalways*** option with the **archive**, **incremental**, and **selective** commands.

Note: The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

Yes
File compression continues even if the file grows as a result of compression. This is the default.

No Backup-archive client objects are resent uncompressed if they grow during compression. API behavior depends on the application. Application backups may fail.

Examples

Options file:

```
compressalways yes
```

Command line:

```
-compressa=no
```

This option is valid only on the initial command line.

Compression

The ***compression*** option compresses files *before* you send them to the server. Compressing your files reduces data storage for backup versions and archive copies of your files. It can, however, affect Tivoli Storage Manager throughput. A fast processor on a slow network connection benefits from compression, but a slow processor on a fast network connection does not.

Note: The client will not compress files that the NetWare operating system already compresses. If you set the ***compression*** option to *yes* and Tivoli Storage Manager finds a file that the NetWare operating system already compresses, the file is sent to the server without further compression. The file is sent as a NetWare compressed file.

If you set the ***compressalways*** option to *yes*, compression continues even if the file size increases. To stop compression if the file size grows, and resend the file uncompressed, set the ***compressalways*** option to *No*.

If you set the ***compression*** option to *yes*, you can control compression processing in the following ways:

- Use the ***exclude.compression*** option in your client options file (dsm.opt) to exclude specific files or groups of files from compression processing. See "Exclude Options" on page 93 for more information.
- Use the ***include.compression*** option in your client options file (dsm.opt) to include files within a broad group of excluded files for compression processing. See "Include Options" on page 98 for more information.

This option controls compression *only if* your administrator specifies that your client node can compress files before sending them to the server.

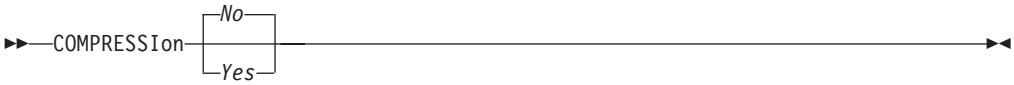
Use the ***compression*** option with the **archive**, **incremental**, and **selective** commands.

Note: The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

No Files are not compressed before they are sent to the server. This is the default. For options with a *No* parameter, acceptable alternatives are **0**, **false**, and **off**.

Yes
Files are compressed before they are sent to the server. For options with a *Yes* parameter, acceptable alternatives are **1**, **true**, and **on**.

Examples

Options file:

```
compression yes
```

Command line:

```
-compressi=no
```

Dateformat

The ***dateformat*** option specifies the format you want to use to display dates.

Use this option if you want to change the default date format for the language of the message repository you are using.

Notes:

1. This ***dateformat*** option does not affect the Web client. The Web client uses the date format for the locale that the browser is running in. If the browser is not running in a locale that Tivoli Storage Manager supports, the Web client uses the date format for American English.
2. When you change the date format and use the ***schedlogretention*** option to prune the schedule log, Tivoli Storage Manager removes all entries in the schedule log with a different date format when pruning the log. When you change the date format and use the ***errorlogretention*** option to prune the error log, Tivoli Storage Manager removes all entries in the error log with a different date when pruning the log. When changing the date format, copy the schedule log and error log if you want to preserve log entries that contain a different date format.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

format_number
Displays the date using one of the following formats. Select the number that corresponds to the date format you want to use:

1 MM/DD/YYYY (This is the default)
2 DD-MM-YYYY
3 YYYY-MM-DD
4 DD.MM.YYYY
5 YYYY.MM.DD

Examples

Options file:

```
dateformat 3
```

Command line:

```
-date=4
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it remains in effect for the entire interactive session or until you enter another ***dateformat*** option.

Dirmc

The ***dirmc*** option specifies the management class you want to use for directories. If you do not specify this option to associate a management class with directories, the client program uses the management class in the active policy set of your policy domain with the longest retention period. Select a management class for individual directories that retains directories at least as long as it retains the files associated with them.

If you specify a management class with this option, all directories specified in a backup operation are bound to that management class.

The ***dirmc*** option specifies the management class of directories you back up and does not effect archived directories. Archived directories are always bound to the default management class.

The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

mgmtclassname
Specifies the name of the management class you want to associate with directories. The client uses the management class name that you specify for all directories that you back up. If you do not specify this option, the client associates the management class with the longest retention period with directories.

Examples

Options file:

```
dirm managdir
```

Command line

```
Does not apply.
```

Domain

The ***domain*** option specifies the volumes that you want to include for incremental backup in your client domain.

Notes:
1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Use the ***domain*** option in your client options file to define your default client domain. Tivoli Storage Manager uses your default client domain in the following situations to determine which volumes to process during an incremental backup:

- When you run an incremental backup using the **incremental** command and you do not specify which volumes to process.
- When your administrator defines a schedule to run an incremental backup for you, but does not specify which volumes to process.

If you do not use the ***domain*** option to specify volumes in your client options file, Tivoli Storage Manager uses the *all-local* parameter as the default.

When you use the ***domain*** option with the **incremental** command, Tivoli Storage Manager adds volumes that you specify to the volumes defined in your client options file. For example, if you enter the following in your client options file:

```
domain sys: data: NDS:
```

and the following on the command line:

```
dsmc incremental -domain=usr:
```

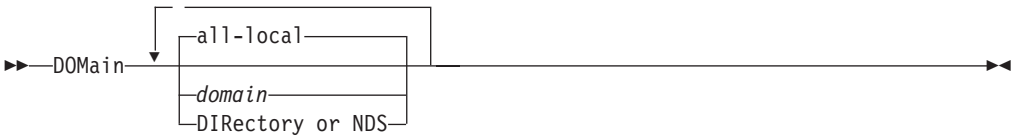
Tivoli Storage Manager performs an incremental backup for your `sys:`, `data:`, and `usr:` volumes.

If you use both a file specification and the ***domain*** option with the **incremental** command, Tivoli Storage Manager ignores the ***domain*** option and processes only those volumes that you specify in the file specification. .

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

all-local
Backs up all local volumes. This is the default.

The NDS is not included in the all-local domain. To include the NDS, add the directory to the domain entry.

domain
Defines the volumes to include in your default client domain.

When you use ***domain*** with the **incremental** command, it processes these volumes in addition to those you specify in your default client domain.

DIRectory or NDS
Specifies the NDS. The NDS is not included in the all-local domain. To include the NDS, add the directory to the domain entry.

Examples

Options file:

```
domain sys:tsm\nds
```

Command line:

```
-domain="servera\sys: serverb/sys:"
```

Editor

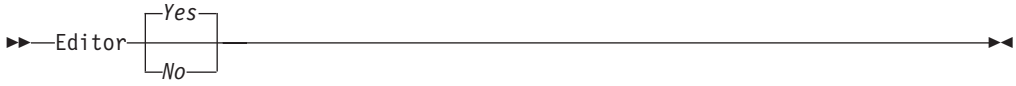
The ***editor*** option turns the command line interface (CLI) editor and retrieve capability on or off.

If the editor and command retrieve functions are not working on a specific workstation setting, we recommend that you turn off this function.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

Yes
Turns on the CLI editor and command retrieve capability. This is the default.

No Turns off the CLI editor and command retrieve capability.

Examples

Options file:

```
editor yes
```

Command line:

```
-editor=yes
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Encryptkey

The ***encryptkey*** option specifies whether to save the encryption key password locally when performing a backup-archive operation or whether to prompt for the encryption key password. The encryption key password is saved to the TSM.PWD file in encrypted format.

If you set the ***encryptkey*** option to *save*, you are only prompted the first time you perform an operation. Thereafter, Tivoli Storage Manager does not prompt for the password.

Note: The Web client saves the encryption key password in the TSM.PWD file. If you do not save the encryption key password, you are prompted for the initial encryption key password when you begin encryption processing.

Options File

Place this option in the client options file `dsm.opt`

`dsm.opt`.

Syntax

Parameters

save
Specifies that you want to save the encryption key password to a local TSM.PWD file. If you set the ***encryptkey*** option to *save*, you are only prompted the first time you perform an operation. Thereafter, Tivoli Storage Manager does not prompt for the password. This is the default.

prompt
Tivoli Storage Manager prompts for the password for each backup, archive, and restore operation.

Examples

Options file:

```
encryptkey prompt
```

Command line:

```
-encryptkey=prompt
```

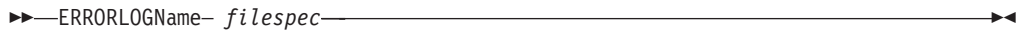
Errorlogname

The ***errorlogname*** option specifies the fully qualified path and file name of the file where you want to store information about errors that occur during processing. The value for this option overrides the DSM_LOG or DSM_DIR environment variables. The `dsmwebcl.log` and `dsmsched.log` files will be created in the same directory as `dsmerror.log`.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

filespec
The fully qualified path and file name where you want to store error log information. Ensure that all directories and subdirectories in the path exist and are accessible by client processing. Tivoli Storage Manager will not create directories for you.

The default file name is `dsmerror.log`; it is placed in your current working directory.

Examples

Options file:

```
errorlogname dmmock\sys:tmp\tsmerror.log
```

Command line:

```
-errorlog=dmmock\sys:tmp\tsmerror.log
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Errorlogretention

The ***errorlogretention*** option specifies how many days to maintain error log entries before pruning, and whether to save the pruned entries. The error log is pruned when the first error is written to the log after a Tivoli Storage Manager session is started. If the only session you run is the client scheduler, and you run it twenty-four hours a day, the error log might not be pruned according to your expectations. Stop the session and start it again to prune the error log when the next error is written.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

N or *days*
Specifies how long to wait before pruning the error log.

N Do not prune the error log. This permits the error log to grow indefinitely. This is the default.

days
The number of days to keep log file entries before pruning the log. The range of values is zero through 9999.

D or *S*
Specifies whether to save the pruned entries. Enter a space or comma to separate this parameter from the previous one.

D Discard the error log entries when you prune the log. This is the default.

S Save the error log entries when you prune the log.

The pruned entries are copied from the error log to the dsmerlog.pru file located in the same directory as the error log.

Examples

Options file:

```
errorlogretention 400 S
```

Command line:

```
-errorlogr=400,S
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Exclude Options

The exclude options exclude objects from backup or archive services. For example, you might want to exclude all temporary files, any local caches of network files, all files that contain compiled object code that you can easily reproduce using other methods, or your operating system files.

You can exclude specific files from encryption processing during a backup.

Notes:

1. When you exclude a file that was previously included, existing backup versions become inactive during the next incremental backup.
2. The server can define exclude options with the ***inclexcl*** option.

Exclude any system files that could corrupt the operating system when recovered. You should also exclude the client directory containing the client files.

Use wildcard characters to exclude a broad range of files. See "Including and Excluding Groups of Files" on page 10 for a list of wildcard characters that you can use. Then, if necessary, use the ***include*** option to make exceptions.

To exclude an entire directory called `any/test`, enter the following:

```
exclude.dir nw2:\sys:any/test
```

To exclude subdirectories that begin with `test` under the `any` directory, enter the following:

```
exclude.dir nw2:\sys:any/test*
```

Wildcards are not supported for the server name or volume name. If you do not specify a server name, Tivoli Storage Manager uses the local server name.

Attention: See "Excluding System Files" on page 10 for a list of files that you should always exclude.

Compression Processing

If you want to exclude specific files or groups of files from compression processing during a backup or archive operation, consider the following:

- You must set the ***compression*** option to *yes* to enable compression processing. If you do not specify the ***compression*** option or you set the ***compression*** option to *no*, Tivoli Storage Manager does not perform compression processing. See "Compression" on page 83 for more information.

  If you set the ***compression*** option to *yes* and no ***exclude.compression*** statements exist, Tivoli Storage Manager considers all files for compression processing.
- Tivoli Storage Manager processes ***exclude.dir*** and other include-exclude statements first. Tivoli Storage Manager then considers any ***exclude.compression*** statements. For example, consider the following include-exclude list:

  ```
  exclude servera\sys:proj/*.*
  exclude.compression servera\sys:proj/file.txt
  include servera\sys:proj/file.txt
  ```

  Tivoli Storage Manager examines the statements (reading from bottom to top) and determines that `servera\sys:proj/file.txt` is a candidate for back up. Tivoli Storage Manager then examines the `exclude.compression servera\sys:proj/file.txt` statement and determines that it is not a candidate for compression processing.

- Include-exclude compression processing is valid for backup and archive processing *only*.

Options File

Place these options in the client options file `dsm.opt`.

Syntax

exclude, exclude.backup, exclude.file, exclude.file.backup
These options are equivalent. Use these options to exclude a file or group of files from backup services.

exclude.archive
Excludes a file or a group of files that match the pattern from archive services *only*.

exclude.compression
Excludes files from compression processing if the ***compression*** option is set to *yes*. This option applies to backups and archives.

exclude.dir
Excludes a directory, its files, and all its subdirectories and their files from backup processing. For example, `exclude.dir nw6\sys:test/dan/data1` excludes `nw6\sys:test/dan/data1`, its files, and all its subdirectories and their files.

However, you can still back up `nw6\sys:test/dan/data1`, its files, and all its subdirectories and their files using a selective backup, as follows:

```
dsmc sel -subdir=yes nw6\sys:test/dan/data1/
```

However, the next time you perform an incremental backup, these backup versions are expired. If you exclude a directory that was previously included, Tivoli Storage Manager marks existing backup versions of the files and directories beneath it inactive during the next incremental backup. Use this option to exclude a portion of your data in which no underlying files need to be backed up. The Tivoli Storage Manager Client API does not support this option.

exclude.encrypt
Excludes the specified files from encryption processing.

Parameters

pattern
Specifies the file or group of files that you want to exclude. End the pattern with a file specification.

Note: If you do not specify a server name, Tivoli Storage Manager uses the local server name.

If the pattern begins with a single or double quote or contains any embedded blanks or equal signs, you must surround the value in either single (') or double (") quotation marks. The opening and closing quotation marks must be the same type of quotation marks.

Examples

Options file:

```
exclude servera\*:.../swapper.dat
exclude n1\*:io.sys
exclude tfr\*:.../spart.par
exclude nw2\sys:*/budget.fin
exclude nw6\sys:devel/*
exclude.archive servera*:/.../events.log
exclude.compression nw6\sys:devel/*
exclude.encrypt servera\*:.../gordon.dat
```

Command line:

Does not apply.

Httpport

The ***httpport*** option specifies a TCP/IP port address for the Web client.

Note: The Tivoli Storage Manager Client API does not support this option.

Tivoli Storage Manager Firewall Support

The ***webports*** option enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Tivoli Storage Manager Client Acceptor daemon and Web Client Agent service for communications with the Web GUI.

The ports you specify with the ***webports*** option and the client option ***httpport*** must be opened in the firewall.

To enable the backup-archive client, Command Line Admin client, and the Scheduler (running in polling mode) to run outside a firewall, the port specified by the server option ***tcpport*** (default 1500) must be opened in the firewall.

Note: Tivoli Storage Manager does not support the scheduler running in *prompted* mode outside a firewall.

See "Tcpport" on page 140 and "Webports" on page 147 for more information. See "Tivoli Storage Manager Firewall Support" on page 23 for further considerations regarding Tivoli Storage Manager firewall support.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

port_address
Specifies the TCP/IP port address that is used to communicate with the Web client. The range of values is 1000 through 32767; the default is 1581.

Examples

Options file:

```
httpport 1502
```

Command line:

```
-httpport=1502
```

Inclexcl

The ***inclexcl*** option specifies the path and file name of an include-exclude options file. Place the ***inclexcl*** option in the include-exclude list in your client options file.

Multiple inclexcl statements are permitted. However, you must specify this option for each include-exclude file.

Ensure that you store your include-exclude options file in a directory to which all users have read access.

When processing occurs, the include-exclude statements within the include-exclude file are placed in the list position occupied by the ***inclexcl*** option, in the same order, and processed accordingly.

For more information about creating an include-exclude options file, see "Creating an Include-Exclude List (Optional)" on page 8.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

filespec
Specifies the path and file name of *one* include-exclude options file.

Examples

Options file:

```
inclexcl servera\sys:dsm/backup.excl
```

Command line:

```
Does not apply.
```

Include Options

The include options specify one of the following:

- Objects within a broad group of excluded objects that you want to include for backup and archive services.
- Files within a broad group of excluded files that you want to include for encryption processing.
- Files within a broad group of excluded files that you want to include for compression processing.
- Objects to which you want to assign a specific management class and a management class name.
- A management class to assign to all objects to which you do not explicitly assign a management class.

If you do not assign a specific management class to objects, Tivoli Storage Manager uses the default management class in the active policy set of your policy domain.

Notes:

1. The ***exclude.dir*** statements override all include statements that match the pattern.
2. The server can also define these options with the ***inclexcl*** option.

Compression Processing

If you want to include specific files or groups of files for compression processing during a backup or archive operation, consider the following:

- You must set the ***compression*** option to *yes* to enable compression processing. If you do not specify the ***compression*** option or you set the ***compression*** option to *no*, Tivoli Storage Manager does not perform compression processing. See "Compression" on page 83 for more information.

  Note: The client will not compress files that the NetWare operating system already compresses. If you set the ***compression*** option to *yes* and Tivoli Storage Manager finds a file that the NetWare operating system already compresses, the file is sent to the server without further compression as a NetWare compressed file.

- Tivoli Storage Manager processes ***exclude.dir*** and other include-exclude statements first. Tivoli Storage Manager then considers any ***include.compression*** statements. For example, consider the following include-exclude list:

  ```
  include.compression servera\sys:proj/file.txt
  exclude servera\sys:proj/file.txt
  ```

  Tivoli Storage Manager examines the `exclude servera\sys:proj/file.txt` statement first and determines that `servera\sys:proj/file.txt` is excluded from processing and is not a candidate for compression processing.

- Include-exclude compression processing is valid for backup and archive processing *only*.

See "Creating an Include-Exclude List (Optional)" on page 8 for more information.

Options File

Place these options in the client options file `dsm.opt`.

Syntax

include, include.backup, include.file
These options are equivalent. Use these options to include files or assign management classes for backup processing.

include.archive
Includes files or assigns management classes for archive processing.

include.compression
Includes files for compression processing if you set the ***compression*** option to *yes*. This option applies to backups and archives.

include.encrypt
Includes the specified files for encryption processing. By default, Tivoli Storage Manager does not perform encryption processing.

Parameters

pattern
Specifies the objects to include for backup or archive processing or to assign a specific management class. End the pattern with a file specification.

If the pattern begins with a single or double quote or contains any embedded blanks or equal signs, you must surround the value in either single (') or double (") quotation marks. The opening and closing quotation marks must be the same type of quotation marks.

mgmtclassname
Specifies the name of the management class to assign to the objects. If a management class is not specified, the default management class is used.

Examples

Options file:

```
include servera\sys:proj/text/devel.*
include servera\sys:proj/text/* textfiles
include *:* managall
include.archive servera\sys:proj/text/* myarchiveclass
include.backup servera\sys:proj/text/* mybackupclass
include.compression servera\sys:proj/text/devel.*
include.encrypt serverb\sys:proj/gordon/*
```

Command line:

```
Does not apply.
```

Language

The ***language*** option specifies the national language in which to present client messages.

You can use American English (AMENG) with all clients. Currently, the NetWare client only supports American English (AMENG).

Note: The ***language*** option does not affect the Web client. The Web client displays in the language associated with the locale of the browser. If the browser is running in a locale that Tivoli Storage Manager does not support, the Web client displays in American English.

Options File

Place this option in the `dsm.opt` file.

Syntax

Parameters

language
Specifies the language you want to use.

Examples

Options file:

```
language ameng
```

Command line:

```
Does not apply.
```

Largecommbuffers

The ***largecommbuffers*** option specifies whether the client uses increased buffers to transfer large amounts of data between the client and the server. You can disable this option when your workstation is running low on memory.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

No Specifies that increased buffers *are not* used to transfer large amounts of data to the server. This is the default.

Yes
Specifies that increased buffers *are* used to transfer large amounts of data to the server.

Examples

Options file:

```
largecommbuffers yes
```

Command line:

```
-largecommbuffers=yes
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Managedservices

The ***managedservices*** option specifies whether the Tivoli Storage Manager Client Acceptor daemon (CAD) manages the scheduler, the Web client, or both.

Note: The Tivoli Storage Manager Client API does not support this option.

See "Configuring the CAD to Manage the Scheduler" on page 55 for instructions to set up the CAD to manage the scheduler.

The CAD serves as an external timer for the scheduler. When the scheduler is started, it queries the server for the next scheduled event. The event is either executed immediately or the scheduler exits. The CAD restarts the scheduler when it is time to execute the scheduled event.

Notes:

1. If you set the ***schedmode*** option to *prompt*, the server prompts the CAD when it is time to run the schedule. The scheduler will connect and disconnect to the server when the CAD is first started.
2. Set the ***passwordaccess*** option to *generate* in your client options, so that Tivoli Storage Manager generates your password automatically. See "Passwordaccess" on page 114 for more information.
3. The CAD console displays information about the next scheduled event.

Using the ***managedservices*** option can provide the following benefits:

- Memory retention problems that may occur when using traditional methods of running the scheduler are resolved. Using the CAD to manage the scheduler requires very little memory between scheduled operations.
- The CAD can manage both the scheduler program and the Web client, reducing the number of background processes on your workstation.
- By default, if you do not specify the ***managedservices*** option, the CAD manages the Web client to provide backward compatibility.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

mode
Specifies whether the CAD manages the scheduler, the Web client, or both.

webclient
Specifies that the CAD manages the Web client. This is the default.

schedule
Specifies that the CAD manages the scheduler.

Examples

Options file:

The following are examples of how you might specify the ***managedservices*** option in your options file.

Task Specify that the CAD manages the Web client *only*.

```
managedservices webclient
```

Task Specify that the CAD manages the scheduler *only*.

```
managedservices schedule
```

Task Specify that the CAD manages both the Web client and the scheduler.

```
managedservices schedule webclient
```

Note: The order in which these values are specified is not important.

Command line:

Does not apply.

Maxcmdretries

The ***maxcmdretries*** option specifies the maximum number of times the client scheduler (on your workstation) attempts to process a scheduled command that fails. The command retry starts *only if* the client scheduler has not yet backed up a file, never connected to the server, or failed before backing up a file. Use this option *only when* the scheduler is running.

Note: The Tivoli Storage Manager Client API does not support this option.

Your administrator can also set this option. If your administrator specifies a value for this option, that value overrides what you specify in the client options file *after* your client node successfully contacts the server.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

maxcmdretries
Specifies the number of times the client scheduler can attempt to process a scheduled command that fails. The range of values is zero through 9999; the default is 2.

Examples

Options file:

```
maxcmdr 4
```

Command line:

```
-maxcmdretries=3
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Memoryefficientbackup

The ***memoryefficientbackup*** option specifies a memory conserving algorithm for processing incremental backups, that backs up one directory at a time, using less memory. Use this option with the **incremental** command when your workstation is memory constrained.

Note: The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

No Your client node uses the faster, more memory-intensive method when processing incremental backups. This is the default.

Yes
Your client node uses the method that requires less memory when processing incremental backups.

Examples

Options file:

```
memoryefficientbackup yes
```

Command line:

```
-memoryef=no
```

Nodename

Use the ***nodename*** option in your client options file `dsm.opt` to identify your workstation to the server. You can use different node names to identify multiple operating systems on your workstation.

When you use the ***nodename*** option, Tivoli Storage Manager prompts for the password assigned to the node you specify, if a password is required.

If you want to restore or retrieve files from the server while you are working from a different workstation, use the ***virtualnodename*** option. See "Virtualnodename" on page 146 for more information.

If you are working from a different workstation, you can use the ***nodename*** option even if the ***passwordaccess*** option is set to *generate*, however, the password will be stored in the registry. To prevent this, use the ***virtualnodename*** option instead of ***nodename***.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

nodename
Specifies a 1 to 64 character node name for which you want to request Tivoli Storage Manager services. The default is the name of the workstation.

Permit the node name to default to the workstation name.

Examples

Options file:

```
nodename cougar
```

Command line:

```
-nod=banshee
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Numberformat

The ***numberformat*** option specifies the format you want to use to display numbers.

Use this option if you want to change the default number format for the language of the message repository you are using.

Note: This ***numberformat*** option does not affect the Web client. The Web client uses the number format for the locale that the browser is running in. If the browser is not running in a supported locale, the Web client uses the number format for American English.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

number

Displays numbers using any one of the following formats. Specify the number (1–6) that corresponds to the number format you want to use.

1 1,000.00 (This is the default)
2 1,000,00
3 1 000,00
4 1 000.00
5 1.000,00
6 1'000,00

Examples

Options file:

```
num 4
```

Command line:

```
-numberformat=4
```

This option is valid on the initial command line and in interactive mode.

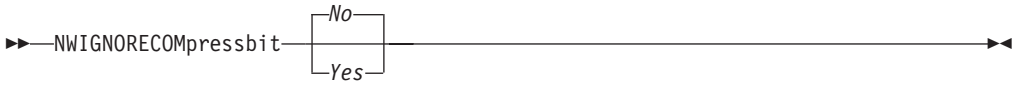
Nwignorecompressbit

The ***nwignorecompressbit*** option specifies whether you want to ignore the setting of the compressed file (Co) attribute during selection processing for incremental backups. This option is valid only on NetWare clients sending an incremental backup on a NetWare 4 file system.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

No Specifies that the NetWare client should interrogate the compressed file attribute during selection processing for incremental backups. This is the default.

Yes
Specifies that the NetWare client should ignore the setting of the compressed file attribute during selection processing for incremental backups. If ***nwignorecompressbit*** is set to *yes* and the only change to the file is compression by the NetWare 4 operating system, the file is not backed up incrementally.

Examples

Options file:

```
nwignorecompressbit yes
```

Command line:

```
Does not apply.
```

Nwpwfile

The ***nwpwfile*** option encrypts the user ID and password for a local or remote NetWare server. The client saves the encrypted user ID and password in the TSM.PWD file.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

Yes
Encrypts the user ID and password the first time a command is sent for a local or remote NetWare server. The encrypted information is stored in the TSM.PWD file. When you enter subsequent commands for that server, the password information is obtained from this file instead of sending a prompt. This is the default.

No Does not encrypt the user ID and password in the TSM.PWD file. Each time you send a command to back up or archive files stored on a remote NetWare server, you are prompted for the user ID and password for the server.

Examples

Options file:

```
nwpwf yes
```

Command line:

```
-nwpwfile=no
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Nwuser

The ***nwuser*** option specifies a user ID and password to connect to a local or remote NetWare server. The user must have NetWare supervisor authority. Use this option in your client options file for each NetWare server. If you do not use this option, you are prompted for a user ID and password for each target service when you start a backup or archive operation.

When logging into a NetWare server from Tivoli Storage Manager, enter one of the following:
- A typeful, full-distinguished name
- A bindery emulation name, used in proper context.

For example, if you received the following message:

```
Please enter NetWare user for "ELLAS":
```

You can specify either: `.CN=Zorba.OU=Islands.O=Greece` or `Zorba` (if the Bindery Context is set to `OU=Islands.O=Greece`. Tivoli Storage Manager rejects the typeless name:

```
Zorba.Islands.Greece
```

Note: Bindery context does not affect Tivoli Storage Manager NDS processing; it is not necessary to specify it.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

servername
A 1 to 48 character NetWare server name to which your client node has access.

user
A 1 to 48 character NetWare user name with supervisor authority on the NetWare server.

password
A 1 to 128 character password for a user with supervisor authority on the NetWare server.

Examples

Options file:

```
nwus servera\supervisor:secret
```

To specify a user ID and password to back up an NDS tree, you would enter: `nwuser treea:.admin.ibm:secret` where **treea** is the NDS tree name.

Command line:

```
-nwuser=serverb\mary:secret1
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Nwwaitonerror

The ***nwwaitonerror*** option specifies that the client program responds in one of the following ways, if an error occurs while exiting:

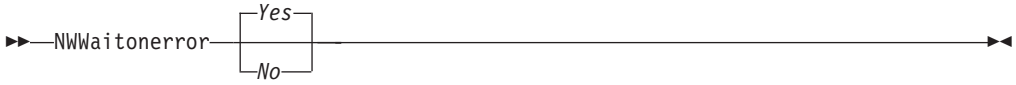
- Display an error message and wait before returning to the NetWare console.
- Return immediately to the NetWare console.

Note: You can use the ***nwwaitonerror*** option when running DSMC in an automated mode, such as, from an .NCF file. By default, you are asked to press any key to continue before you exit the DSMC program. If you specify *yes*, DSMC will not prompt.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

Yes
Specifies that the client program displays an error message if it encounters an error. Press Enter to return to the NetWare console. This is the default.

No Specifies that the client program returns immediately to the NetWare console if it encounters an error while exiting. An error message is not displayed.

Examples

Options file:

```
nww yes
```

Command line:

```
Does not apply.
```

Password

The ***password*** option specifies a Tivoli Storage Manager password. If you do not specify this option and your administrator has set authentication to *On*, you are prompted for a password when you start a Tivoli Storage Manager session.

Notes:

1. If the server prompts for a password, the password does not display as you enter it. However, if you use the password option on the command line, your password will display as you enter it.
2. If the Tivoli Storage Manager server name changes or Tivoli Storage Manager clients are directed to a different Tivoli Storage Manager server, all clients will need to have a new password initialized for the new server name.

The ***password*** option is ignored when the ***passwordaccess*** option is set to *generate*.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

password
Specifies a 1 to 63 character password. A password is not case-sensitive. Valid characters include:

Characters

	Description
A–Z	Any letter, A through Z, uppercase or lowercase
0–9	Any number, 0 through 9
+	Plus
.	Period
_	Underscore
-	Hyphen
&	Ampersand

Examples

Options file:

```
password secretword
```

Command line:

```
-password=secretword
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Passwordaccess

The ***passwordaccess*** option specifies whether you want to generate your password automatically or set as a user prompt. Your administrator can require a password for your client node by enabling the authentication feature. Ask your administrator if a password is required for your client node.

If a password is required, you can choose to:

- Set the password for your client node yourself and have Tivoli Storage Manager prompt for it each time you request services.
- Let Tivoli Storage Manager automatically generate a new password for your client node each time it expires, encrypt and store the password in a file, and retrieve the password from that file when you request services. You are not prompted for the password.

Use the ***passworddir*** option in your client options file `dsm.opt` to specify the directory location in which to store the encrypted password file. The default directory location depends on how the client was installed.

When the ***passwordaccess*** option is set to *generate* and you specify the ***password*** option, the ***password*** option is ignored.

Set the ***passwordaccess*** option to *generate* when using the Web client.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

prompt
You are prompted for your workstation password each time a client connects to the server. This is the default.

To keep your client node password secure, enter commands without the password and wait for Tivoli Storage Manager to prompt you for the password.

API applications must supply the password when a session is initiated. The application is responsible for obtaining the password.

generate
Encrypts and stores your password locally and generates a new password when the old password expires. An encrypted password is kept on your workstation when a session starts.

A password prompt displays when registering a workstation with a server using open registration or if your administrator changes your password manually.

Examples

Options file:

```
passwordaccess generate
```

Command line:

```
-passwordaccess=generate
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Passworddir

The ***passworddir*** option forces the directory location in which to store an encrypted password file. The default directory location depends upon how the client was installed.

Options File

Place this option in the client options `dsm.opt` file.

Syntax

Parameters

directoryname
Specifies the path in which to store the encrypted password file. The name of the password file is TSM.PWD. If any part of the specified path does not exist, Tivoli Storage Manager attempts to create it.

Examples

Options file:

```
passworddir dmmock\sys:security\tsm
```

Command line:

```
Does not apply.
```

Postschedulecmd

The ***postschedulecmd*** option specifies a command that the client program processes after it runs a schedule. The client program waits for the command to complete before it continues with other processing.

Notes:

1. If the ***postschedulecmd*** command does not complete with return code 0, the client will report that the scheduled event completed with return code 8 (unless the scheduled operation encounters a more severe error yielding a higher return code). If you do not want the ***postschedulecmd*** command to be governed by this rule, you can create a script or batch file that invokes the command and exits with return code 0. Then configure ***postschedulecmd*** to invoke the script or batch file. The return code for the ***postschedulecmd*** command is not tracked, and does not influence the return code of the scheduled event.
2. The Tivoli Storage Manager Client API does not support this option.
3. The server can also define the ***postschedulecmd*** option .

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

"cmdstring"
Specifies the command to process. You can enter a command to be executed after a schedule with this option. Use only one ***postschedulecmd*** option.

Use a blank, or null, string for *cmdstring* if you want to prevent any commands from running that the administrator uses for ***postschedulecmd*** or ***preschedulecmd***. If you specify a blank or null string on *either* option, it prevents the administrator from using a command on *both* options.

If your administrator uses a blank or null string on the ***postschedulecmd*** option, you cannot run a post-schedule command.

If the command string contains blanks, enclose the command string in double quotes. If you placed double quotes within the command string, then enclose the entire command string in single quotes.

Examples

Options file:

```
postschedulecmd "restart database"
```

The command string is a valid command for restarting your database.

Command line:

```
Does not apply.
```

Preschedulecmd

The ***preschedulecmd*** option specifies a command that the client program processes before it runs a schedule. The client program waits for the command to complete before it starts the schedule.

Notes:

1. Successful completion of the ***preschedulecmd*** command is considered to be a prerequisite to running the scheduled operation. If the ***preschedulecmd*** command does not complete with return code 0, the scheduled operation and any ***postschedulecmd*** and ***postnschedulecmd*** commands will not run. The client will report that the scheduled event failed, and the return code will be 12. If you do not want the ***preschedulecmd*** command to be governed by this rule, you can create a script or batch file that invokes the command and exits with return code 0. Then configure ***preschedulecmd*** to invoke the script or batch file. The return code for the ***preschedulecmd*** command is not tracked, and does not influence the return code of the scheduled event.
2. The Tivoli Storage Manager Client API does not support this option.
3. The server can also define the ***preschedulecmd*** option .

Options File

Place this option in the client options file `dsm.opt`.

Syntax

```
►►—PRESchedulecmd— "cmdstring" ————————————————————————————►◄
```

Parameters

"cmdstring"

Specifies the command to process. Use only one ***preschedulecmd*** option. You can enter a command to be executed before a schedule using this option.

Use a blank or null string for *cmdstring* if you want to prevent any commands from running that the administrator uses for ***postschedulecmd*** and ***preschedulecmd***. If you specify a blank or null string on *either* option, it prevents the administrator from using a command on *both* options.

If your administrator uses a blank or null string on the ***preschedulecmd*** option, you cannot run a pre-schedule command.

If the command string contains blanks, enclose the command string in double quotes. If you placed double quotes within the command string, then enclose the entire command string in single quotes.

Examples

Options file:

```
preschedulecmd "<insert your database product's quiesce command
here> database"
```

The command string is a valid command for quiescing your database.

Command line:

```
Does not apply.
```

Processorutilization

The ***processorutilization*** option specifies the amount of CPU time assigned to the client program. Because this option can affect other applications on your client node, use it only when speed is a high priority.

Note: The Tivoli Storage Manager Client API does not support this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

number
Specifies the amount of time the client program will control the CPU, in hundredths of a second, before giving it to another application. For example, if the number is 1000, the client program controls the CPU for 10 seconds. The minimum value is zero. There is no maximum value. The default is zero.

Examples

Options file:

```
processor 2
```

Command line:

```
-processorutilization=10
```

Queryschedperiod

The ***queryschedperiod*** option specifies the number of hours you want the client scheduler to wait between attempts to contact the server for scheduled work. This option applies only when you set the ***schedmode*** option to *polling*. This option is used only when the **scheduler** is running.

Your administrator can also set this option. If your administrator specifies a value for this option, that value overrides the value set in your client options file after your client node successfully contacts the server.

Notes:

1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

hours

Specifies the number of hours the client scheduler waits between attempts to contact the server for scheduled work. The range of values is 1 through 9999; the default is 12.

Examples

Options file:

```
querysch 6
```

Command line:

```
-queryschedperiod=8
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Quiet

The ***quiet*** option limits the number of messages that display on your screen during processing. For example, when you run the **incremental**, **selective**, or **archive** commands, information may appear about each file that is backed up. Use the ***quiet*** option if you do not want to display this information.

When you use the ***quiet*** option, error and processing information appears on your screen, and messages are written to log files. If you do not specify ***quiet***, the default option, ***verbose*** is used.

Notes:
1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define the **quiet** option and override the client setting.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

There are no parameters for this option.

Examples

Options file:

```
quiet
```

Command line:

```
-quiet
```

This option is valid on the initial command line and in interactive mode.

Replace

The ***replace*** option specifies what you want the system to do when it restores files that already exist on your workstation. This option applies to the **restore**, **retrieve**, and **restore backupset** commands *only*.

Note: The Tivoli Storage Manager Client API does not support this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

Prompt
You are prompted whether to overwrite a file that already exists on your workstation. If the existing file is read-only, you are prompted whether to overwrite it. This is the default.

All
All existing files are overwritten, including read-only files. If access to a file is denied, you are prompted to skip or overwrite the file. No action is taken on the file until there is a response to the prompt.

Yes
Any existing files are overwritten, *except* read-only files. If a file is read-only, you are prompted to overwrite the file or skip it. No action is taken on the file until there is a response to the prompt. If access to a file is denied, the file is skipped.

No Existing files are not overwritten. No prompts will display.

Examples

Options file:

```
replace all
```

Command line:

```
-replace=no
```

Resourceutilization

Use the ***resourceutilization*** option in your client options file `dsm.opt` to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.

Regulating Backup and Archive Sessions

When you request a backup or archive, the client can use more than one session to the server. The default is to use a maximum of two sessions; one to query the server and one to send file data. The client can use only one server session if you specify a ***resourceutilization*** setting of 1.

A client can use more than the default number of sessions when connecting to a server that is Version 3.7 or higher. For example, ***resourceutilization***=10 permits up to eight sessions with the server. Multiple sessions may be used for querying the server and sending file data.

Multiple query sessions are used when you specify multiple file specifications with a backup or archive command. For example, if you enter:

```
inc filespaceA filespaceB
```

and you specify ***resourceutilization***=5, the client may start a second session to query files on file space B. Whether or not the second session starts depends on how long it takes to query the server about files backed up on file space A. The client may also try to read data from the file system and send it to the server on multiple sessions.

Regulating Restore Sessions

When you request a restore, the default is to use a maximum of one session, based on how many tapes the requested data is stored on, how many tape drives are available, and the maximum number of mount points allowed for the node.

Notes:

1. If all of the files are on disk, only one session is used. There is no multi-session for a pure disk storage pool restore. However, if you are performing a restore in which the files reside on 4 tapes and some on disk, you could use up to 5 sessions during the restore.
2. The Tivoli Storage Manager server can set the maximum number of mount points a node can use on the server using the MAXNUMMP parameter.

For example, if the data you want to restore is on 5 different tape volumes, the maximum number of mount points is 5 for your node, and ***resourceutilization*** is set to 3, then 3 sessions will be used for the restore. If you increase the ***resourceutilization*** setting to 5, then 5 sessions will be used for the restore. There is a 1 to 1 relationship to the number of restore sessions allowed and the ***resourceutilization*** setting. Multiple restore sessions are only allowed for no query restore operations.

Considerations

The following factors can affect the throughput of multiple sessions:

- The server's ability to handle multiple client sessions. Is there sufficient memory, multiple storage volumes, and CPU cycles to increase backup throughput?
- The client's ability to drive multiple sessions (sufficient CPU, memory, etc.).
- The configuration of the client storage subsystem. File systems that are striped across multiple disks, using either software striping or RAID-5 can better handle an increase in random read requests than a single drive file system. Additionally,

a single drive file system may not see performance improvement if it attempts to handle many random concurrent read requests.

- Sufficient bandwidth in the network to support the increased traffic.

Potentially undesirable aspects of running multiple sessions include:

- The client could produce multiple accounting records.
- The server may not start enough concurrent sessions. To avoid this, the server *maxsessions* parameter must be reviewed and possibly changed.
- A query node command may not summarize client activity.

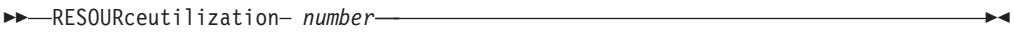
Notes:

1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt` .

Syntax



Parameters

number
Specifies the level of resources the Tivoli Storage Manager server and client can use during processing. The range of values that you can specify is 1 through 10.

Examples

Options file:

```
resourceutilization 7
```

Command line:

```
Does not apply
```

Retryperiod

The ***retryperiod*** option specifies the number of minutes the client scheduler waits between attempts to process a scheduled command that fails, or between unsuccessful attempts to report results to the server. Use this option only when the scheduler is running.

Your administrator can also set this option. If your administrator specifies a value for this option, that value overrides the value in your client options file after your client node successfully contacts the server.

Note: The Tivoli Storage Manager Client API does not support this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

minutes
Specifies the number of minutes the client scheduler waits between attempts to contact the server, or to process a scheduled command that fails. The range of values is 1 through 9999; the default is 20.

Examples

Options file:

```
retryp 10
```

Command line:

```
-retryperiod=10
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Revokeremoteaccess

The ***revokeremoteaccess*** option restricts an administrator with client access privilege from accessing a client workstation that is running the Web client. This option does not restrict administrators with client owner, system, or policy privilege from accessing your workstation through the Web client.

Note: The Tivoli Storage Manager Client API does not support this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

None
Does not revoke access to administrators who have client access authority for the client. This is the default.

Access
Revokes access to administrators who have client access authority for the client.

Examples

Options file:

```
revokeremoteaccess none
```

Command line:

```
Does not apply
```

Schedcmddisabled

The ***schedcmddisabled*** option specifies whether to disable the scheduling of commands by the server ***action*=command** option on the **define schedule** server command.

This option does not disable the ***preschedulecmd*** and ***postschedulecmd*** commands. However, you can specify ***preschedulecmd*** or ***postschedulecmd*** with a blank or a null string to disable the scheduling of these commands. Commands scheduled by the server using the ***action*=command** option on the **define schedule** server command may also be disabled in the same way.

Use the **query schedule** command to query the schedules defined by your administrator. See "Query Schedule" on page 208 for more information.

Notes:

1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

Yes
Specifies that Tivoli Storage Manager disables the scheduling of commands by the server using the ***action*=command** option on the **define schedule** server command.

No Specifies that Tivoli Storage Manager does not disable the scheduling of commands by the server using the ***action*=command** option on the **define schedule** server command. This is the default.

Examples

Options file:

```
schedcmddisabled no
```

Command line:

```
Does not apply.
```

Schedlogname

The ***schedlogname*** option specifies the path and file name where you want to store schedule log information. Use this option only when the scheduler is running.

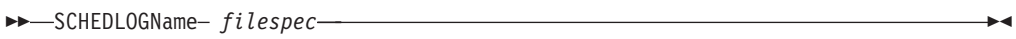
When you run the **schedule** command, output from scheduled commands is displayed on your screen. Output is also sent to the file you specify with this option.

Note: The Tivoli Storage Manager Client API does not support this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

filespec
Specifies the path and file name where you want to store schedule log information when processing scheduled work.

If you specify a file name only, the file is stored in your current directory. The default is the installation directory with a file name of `dsmsched.log`.

Examples

Options file:

```
schedlogname dmmock\sys:mydir/schedlog.jan
```

Command line:

```
-schedlogn=dmmock\sys:mydir/schedlog.jan
```

This option is valid only on the initial command line. It is not valid in interactive mode.

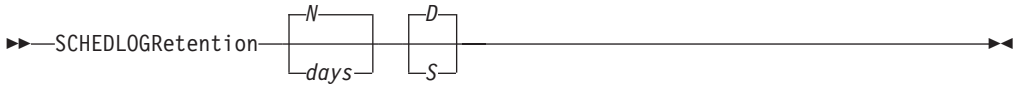
Schedlogretention

The ***schedlogretention*** option specifies the number of days to keep entries in the schedule log, and whether to save the pruned entries. The schedule log is pruned after a scheduled event completes.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

N or *days*

Specifies how long to wait before pruning the schedule log.

N Do not prune the log. This permits the log to grow indefinitely. This is the default.

days

Specifies the number of days to keep log file entries before pruning. The range of values is zero through 9999.

D or *S*

Specifies whether to save the pruned entries. Use a space or comma to separate this parameter from the previous one.

D Discards the log entries when pruning the log. This is the default.

S Saves the log entries when pruning the log.

Pruned entries are copied to the `dsmsched.pru` file that is stored in the same directory as the schedule log.

Examples

Options file:

```
schedlogretention 30 S
```

Command line:

```
-schedlogretention=30,S
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Schedmode

The ***schedmode*** option specifies whether you want to use the *polling* mode (your client node periodically queries the server for scheduled work), or the *prompted* mode (the server contacts your client node when it is time to start a scheduled operation). All communication methods can use the client polling mode, but only TCP/IP can use the server prompted mode.

Note: This option applies *only if* you are using the TCP/IP communication method, and the **schedule** command is running.

Your administrator can specify that the server support both modes or just one mode. If your administrator specifies that both modes are supported, you can select either schedule mode. If your administrator specifies only one mode, you must specify that mode in your client options file or scheduled work will not process.

If you specify the *prompted* mode, you must supply values for the ***tcpclientaddress*** and ***tcpclientport*** options on the **schedule** command. You can then be contacted at an address or port other than the one that made first contact with the server.

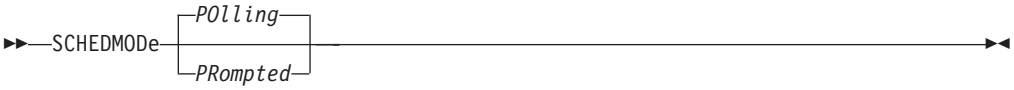
Notes:

1. Tivoli Storage Manager does not support the scheduler running in prompted mode outside a firewall.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

POlling
The client scheduler queries the server for scheduled work at prescribed time intervals. This is the default. You can set the time intervals using the ***queryschedperiod*** option.

PRompted
The client scheduler waits for the server to contact your client node when scheduled work needs to be done.

Examples

Options file:

```
schedmode prompted
```

Command line:

```
-schedmod=po
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Scrolllines

The ***scrolllines*** option specifies the number of lines of information that display on your screen at one time. Use this option when you set the ***scrollprompt*** option to *Yes* and you use commands.

Use the ***scrollprompt*** option with all query commands except the following:

- **query mgmtclass**
- **query schedule**
- **query session**
- **query inclexcl**
- **query tsa**

Notes:

1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

number
Specifies the number of lines of information that display on your screen at one time. The range of values is 1 through 80; the default is 20.

Examples

Options file:

```
scrolllines 25
```

Command line:

```
-scrolll=25
```

This option is valid on the initial command line and in interactive mode.

Scrollprompt

The ***scrollprompt*** option specifies whether you want Tivoli Storage Manager to stop and wait after displaying the number of lines of information you specified with the ***scrolllines*** option, or scroll through and stop at the end of the information list.

Use the ***scrollprompt*** option with all query commands except the following:

- **query mgmtclass**
- **query schedule**
- **query session**
- **query inclexcl**
- **query tsa**

Notes:

1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

No Scrolls to the end of the list and stops. This is the default.

Yes
Stops and waits after displaying the number of lines you specified with the ***scrolllines*** option. The following prompt displays at the bottom of the screen:

```
Press 'Q' to quit, 'C' to continuous scroll, or 'Enter' to
continue.
```

Examples

Options file:

```
scrollprompt yes
```

Command line:

```
-scrollp=yes
```

This option is valid on the initial command line and in interactive mode.

Subdir

The ***subdir*** option specifies whether you want to include subdirectories of named directories for processing on the following commands:

archive
delete archive
incremental (if the file specification is not a domain)
query archive
query backup
query backupset
restore
restore backupset
retrieve
selective

For example, if you specify ***subdir***=*yes* when backing up a specific path and file, Tivoli Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

Notes:

1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

No Subdirectories are not processed. This is the default.

Yes
Subdirectories are processed. Because the client program searches all subdirectories of a directory that is being processed, processing can take longer to complete. Specify *Yes* only when necessary.

Note: If you use the *preservepath* option in addition to ***subdir***=*yes*, it can affect which subdirectories are processed. For more information, see "Preservepath" on page 174.

Examples

Options file:

```
subdir no
```

Command line:

To restore the structure:

```
/path2/dir1
/path2/dir1/file1
/path2/dir1/dir2
/path2/dir1/dir2/file1
```

enter any of the following commands:

```
dsmc rest sys:path/nds1/* sys:path2/ -su=y
dsmc rest sys:path/nds1/file* sys:path2/ -su=y
dsmc rest sys:path/nds1/file1* sys:path2/ -su=y
```

Tapeprompt

The ***tapeprompt*** option specifies whether you want to wait for a tape to mount if it is required for a backup, archive, restore, or retrieve process, or to be prompted for a choice.

Tape prompting does not occur during a scheduled operation regardless of the setting for the ***tapeprompt*** option.

The ***tapeprompt*** option can be used with the following commands:

archive
incremental
restore
retrieve
selective

Note: The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

No You are not prompted for your choice. The server waits for the appropriate tape to mount. This is the default.

Yes
You are prompted when a tape is required to back up, archive, restore, or retrieve data. At the prompt, you can wait for the appropriate tape to be mounted, always wait for a tape to be mounted, skip a particular object, skip all objects on a single tape, skip all objects on all tapes, or cancel the entire operation.

Examples

Options file:

```
tapeprompt yes
```

Command line:

```
-tapep=yes
```

This option is valid on the initial command line and in interactive mode.

Tcpbuffsize

The ***tcpbuffsize*** option specifies the size of the internal TCP/IP communication buffer. Although it uses more memory, a larger buffer can improve communication performance.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

size

Specifies the size, in kilobytes, that you want to use for the internal TCP/IP communication buffer. The range of values is 1 through 512; the default is 31.

Depending on the operating system communication settings, your system might not accept all values in the range of 1 through 512.

Examples

Options file:

```
tcpb 2
```

Command line:

```
-tcpbuffsize=31
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpclientaddress

The ***tcpclientaddress*** option specifies a TCP/IP address if your client node has more than one address, and you want the server to contact an address other than the one that was used to make the first server contact.

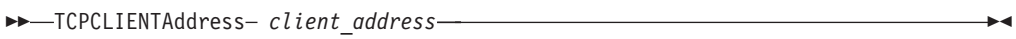
Use this option only if you use the *prompted* parameter with the ***schedmode*** option or when the **schedule** command is running.

Note: The Tivoli Storage Manager Client API does not support this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

client_address
Specifies the TCP/IP address you want the server to use to contact your client node. Specify a TCP/IP Internet dot address only.

Examples

Options file:

```
tcpclienta 128.33.10.249
```

Command line:

```
-tcpclientaddress=128.33.10.249
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpclientport

The ***tcpclientport*** option specifies a different TCP/IP port number for the server to contact than the one that was used to make the first server contact. If the default port or the specified port is busy, the server attempts to use any available port. Use this option only if you specify the *prompted* parameter with the ***schedmode*** option or when the **schedule** command is running.

Note: The Tivoli Storage Manager Client API does not support this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

client_port_address
Specifies the TCP/IP port address you want the server to use to contact your client node. The range of values is 1000 through 32767; the default is 1501.

Examples

Options file:

```
tcpclientp 1502
```

Command line:

```
-tcpclientport=1492
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpport

The ***tcpport*** option specifies a TCP/IP port address for a server. You can obtain this address from your administrator.

Tivoli Storage Manager Firewall Support

To enable the backup-archive client, Command Line Admin client, and the Scheduler (running in polling mode) to run outside a firewall, the port specified by the option ***tcpport*** (default 1500) must be opened in the firewall.

Note: Tivoli Storage Manager does not support the scheduler running in *prompted* mode outside a firewall.

The ***webports*** option enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Tivoli Storage Manager Client Acceptor daemon and the Web Client Agent service for communications with the Web GUI.

The ports specified with the ***webports*** option and the client option ***httpport*** must be opened in the firewall. See "Httpport" on page 96 and "Webports" on page 147 for more information.

See "Tivoli Storage Manager Firewall Support" on page 23 for further considerations regarding Tivoli Storage Manager firewall support.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

port_address
Specifies the TCP/IP port address that is used to communicate with a server. The range of values is 1000 through 32767; the default is 1500.

Examples

Options file:

```
tcpp 1501
```

Command line:

```
-tcpport=1501
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpserveraddress

The ***tcpserveraddress*** option specifies the TCP/IP address for a server. You can obtain this server address from your administrator.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

server_address
Specifies a 1 to 64 character TCP/IP address for a server. Specify only a dot address.

Examples

Options file:

```
tcps dsmchost.endicott.ibm.com
```

Command line:

```
-tcpserveraddress=129.33.24.99
```

This option is valid only on the initial command line. It is not valid in interactive mode.

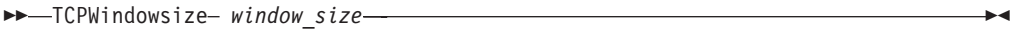
Tcpwindowsize

The ***tcpwindowsize*** option specifies the amount of data in kilobytes that is buffered when receiving data on a TCP/IP connection. To improve backup or archive performance, increase the tcpwindowsize on the server. To improve restore or retrieve performance, increase the tcpwindowsize on the client.

Options File

Place this option in the client options file `dsm.opt`.

Syntax



Parameters

window_size
Specifies the size, in kilobytes, to use for your client node TCP/IP sliding window.

The range of values is 1 through 64; the default is 32.

Note: Depending on the operating system communication settings, your system might not accept all values in the range of values.

Examples

Options file:

```
tcpwindowsize 1
```

Command line:

```
-tcpw=24
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Timeformat

The ***timeformat*** option specifies the format in which you want to display system time.

Use this option if you want to change the default time format for the language of the message repository you are using.

Note: This ***timeformat*** option does not affect the Web client. The Web client uses the time format for the locale that the browser is running in. If the browser is not running in a locale that Tivoli Storage Manager supports, the Web client uses the time format for American English.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

```
►►—TIMEformat— format_number———————————————————————————————►◄
```

Parameters

format_number

Displays time in one of the formats listed below. Select the format number that corresponds to the format you want to use.

1 23:00:00 (This is the default)
2 23,00,00
3 23.00.00
4 12:00:00 A/P

Examples

Options file:

```
timeformat 4
```

Command line:

```
-time=3
```

Txnbytelimit

The ***txnbytelimit*** option specifies the number of kilobytes the client program buffers before it sends a transaction to the server.

Note: The server can also define and adjust this option during self-tuning operations.

A *transaction* is the unit of work exchanged between the client and server. Because the client program can transfer more than one file or directory between the client and server before it commits the data to server storage, a transaction can contain more than one file or directory. This is called a *transaction group*.

This option permits you to control the amount of data sent between the client and server before the server commits the data and changes to the server database, thus changing the speed with which the client performs work. The amount of data sent applies when files are batched together during backup or when receiving files from the server during a restore procedure.

The server administrator can limit the number of files or directories contained within a transaction group using the ***txngroupmax*** option; the actual size of a transaction can be less than your limit. Once this number is reached, the client sends the files to the server *even if* the transaction byte limit is not reached.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

number
Specifies the number of kilobytes the client program can buffer together in a transaction before it sends data to the server. The range of values is 300 through 2097152 (2 GB); the default is 2048.

Examples

Options file:

```
txnb 2048
```

Command line:

```
-txnb=2048
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Verbose

The ***verbose*** option specifies that you want processing information to display on your screen. This is the default. When you run the **incremental**, **selective**, or **archive** commands, information displays about each file that is backed up. Use the ***quiet*** option if you do not want to display this information.

The following behavior applies when using the ***verbose*** and ***quiet*** options

- If the server specifies either the ***quiet*** or ***verbose*** option in the server client option set, the server settings override the client values, even if **force** is set to *No* on the server.
- If you specify ***quiet*** in your `dsm.opt` file, and you specify *-verbose* on the command line, *-verbose* prevails.
- If you specify both *-quiet* and *-verbose* on the same command, the last option encountered during options processing prevails. If you specify *-quiet -verbose*, *-verbose* prevails. If you specify *-verbose -quiet*, *-quiet* prevails.

Notes:

1. The Tivoli Storage Manager Client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

There are no parameters for this option.

Examples

Options file:

```
verbose
```

Command line:

```
-verbose
```

This option is valid on the initial command line and in interactive mode.

Virtualnodename

The ***virtualnodename*** option specifies the node name of your workstation when you want to restore or retrieve files to a different workstation.

When you use the ***virtualnodename*** option in your client options file, or with a command:

- You must specify the name you specified with the ***nodename*** option in your client options file (`dsm.opt`). This name should be different from the name returned by the **hostname** command on your workstation.
- Tivoli Storage Manager prompts for the password assigned to the node you specify, if a password is required. If you enter the correct password, you have access to all backups and archives that originated from the specified node.

When connecting to a server, the client must identity itself to the server. This login identification is determined in the following ways:

- If the ***nodename*** and ***virtualnodename*** options are not specified, or a virtual node name is not specified on the command line, the default login ID is the name returned by the **hostname** command.
- If the ***nodename*** option is specified, the name specified with the ***nodename*** option overrides the name returned by the **hostname** command.
- If the ***virtualnodename*** option is specified, or a virtual node name is specified on a command line, it cannot be the same name as the name returned by the **hostname** command.

When the virtual node name is accepted by the server, a password is required (assuming authentication is on), even if the ***passwordaccess*** option is *generate*. Once a connection to the server is established, then access is permitted to any file backed up using this login ID.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

nodename
Specifies a 1- to 64-character name that identifies the node for which you want to request Tivoli Storage Manager services. There is no default.

Examples

Options file:

```
virtualnodename cougar
```

Command line:

```
-virtualn=banshee
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Webports

The ***webports*** option enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Tivoli Storage Manager Client Acceptor daemon and Web Client Agent service for communications with the Web GUI.

Values for both the Client Acceptor daemon and the Web Client Agent service are required.

If you do not specify this option, the default value, zero (0), is used for both ports. This causes TCP/IP to randomly assign a free port number for the Client Acceptor daemon and the Web Client Agent service.

The ports you specify with the ***webports*** and ***httpport*** options must be opened in the firewall.

To enable the backup-archive client, Command Line Admin client, and the Scheduler (running in polling mode) to run outside a firewall, the port specified by the server option ***tcpport*** (default 1500) must be opened in the firewall.

Note: Tivoli Storage Manager does not support the scheduler running in *prompted* mode outside a firewall.

To enable the administrative Web interface to run outside a firewall the port specified by server option ***httpport*** (default is 1580) must be opened in the firewall.

See "Httpport" on page 96 and "Tcpport" on page 140 for more information.

Notes:

1. See "Tivoli Storage Manager Firewall Support" on page 23 for further considerations regarding Tivoli Storage Manager firewall support.
2. The Tivoli Storage Manager Client API does not support this option.

Options File

Place this option in the client options file `dsm.opt`.

Syntax

Parameters

cadport
Specifies the *required* Tivoli Storage Manager Client Acceptor daemon port number. If a value is not specified, the default, zero (0), causes TCP/IP to randomly assign a free port number.

agentport
Specifies the *required* Tivoli Storage Manager Web client agent service port number. If a value is not specified, the default, zero (0), causes TCP/IP to randomly assign a free port number.

Examples

Options file:

```
webports 2123 2124
```

Command line:

```
-webports=2123,2124
```

Chapter 10. Using Options with Commands

The client program includes a group of *client command options* that you can enter with specific commands *only* from the command line. You can also enter common options to override many of the options set in your client options file `dsm.opt`. Options are processed following this precedence (order):

1. Options defined on the server with server-enforced client options. The client *cannot* override the value.
2. Options entered locally on the command line.
3. Options defined on the server for a schedule using the options parameters.
4. Options entered locally in the options file.
5. Options received from the server with client options not enforced by the server. The client *can* override the value.
6. Default option values.

For a complete list of client command options, their descriptions, the commands with which you can use them, and the location in this book for more information, see Table 26 on page 149. For a complete list of common options, see Chapter 9, "Using Processing Options" on page 69.

Entering Options with a Command

Follow these general rules when you enter options with a command:

- Enter a command, a dash (–), the option name, an equal sign (=), and the option value or parameter. There should be no spaces on either side of the = sign. For example,

  ```
  dsmc archive -description="Project A" sys:usr/home/proj1/*
  ```

- For options that do not include parameters, enter a command, a dash (–) and the option name. For example,

  ```
  dsmc incremental -quiet
  ```

- Enter either the option name, or an abbreviation for the option name. For example, to enter the ***latest*** option, enter either `-lat` or `-latest`. The capital letters in the syntax of each option indicate the minimum abbreviation for that option name. To understand how to read the syntax diagrams, see "Reading Syntax Diagrams" on page xii.
- Enter options in any order before or after command parameters. For example, you can enter the ***subdir*** option before or after a file specification:

  ```
  dsmc selective -subdir=yes sys:usr/home/proj1/
  dsmc selective sys:usr/home/proj1/ -subdir=yes
  ```

- Separate options with a blank space when you enter more than one option in a command.
- Enclose the option parameter in quotes (" ") if it contains a blank space:

  ```
  dsmc archive -description="Project A" sys:usr/home/proj1/
  ```

- The maximum number of characters for a file name is 256. The maximum combined length of the file name and path name is 512 characters.

Table 26. Client Command Options

Command Option	Description	Commands	Page
archmc	Overrides the default management class for a file or a group of files.	**archive**	153

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Table 26. Client Command Options (continued)

Command Option	Description	Commands	Page
deletefiles	Deletes the local copy of files from your workstation after they are archived on the server.	**archive**	154
description	Specifies a description for a file that you are archiving, deleting, or retrieving. Also specifies the description of a backupset that you want to query.	**archive** **delete archive** **query archive** **query backupset** **retrieve**	155
detail	Displays management class attributes for available management classes.	**delete filespace** **query mgmtclass** **query filespace**	156
dirsonly	Backs up, restores, archives, retrieves, or displays directories *only*.	**archive** **incremental** **query archive** **query backup** **restore** **retrieve** **selective**	157
filelist	Specifies a list of files to be processed for the command. Tivoli Storage Manager opens the designated filelist and processes the files listed within according to the command.	**archive** **delete archive** **expire** **incremental** **query backup** **query archive** **restore** **retrieve** **selective**	158
filesonly	Backs up, restores, retrieves, or displays files *only*.	**incremental** **query archive** **query backup** **restore** **retrieve** **selective**	160
fromdate	Sets a date limit for files. Tivoli Storage Manager does not include files processed before this date, although older directories might be included.	**query archive** **query backup** **restore** **retrieve**	161
fromnode	Displays file spaces for an alternate node. Also specifies an alternate node from which to restore or retrieve files.	**query archive** **query backup** **query filespace** **query mgmtclass** **restore** **retrieve**	162
fromtime	Specifies a beginning time on the specified date. Use with the ***fromdate*** option. This option is ignored if the ***fromdate*** option is absent.	**query archive** **query backup** **restore** **retrieve**	163
ifnewer	Replaces existing files with the latest backup version only if the backup version is newer than the existing version.	**restore** **restore backupset** **retrieve**	164

Table 26. Client Command Options (continued)

Command Option	Description	Commands	Page
inactive	Displays a list of active and inactive files when used with the ***pick*** option.	**query backup** **restore**	165
incrbydate	Requests an incremental backup by date.	**incremental**	166
latest	Restores the most recent backup version of a file whether it is active or inactive.	**restore**	167
location	Specifies whether Tivoli Storage Manager searches for a backup set on the server or in local files during a query or restore operation.	**query backupset** **restore backupset**	168
noprompt	Suppresses the confirmation prompt when deleting an archived file.	**delete archive**	169
optfile	Specifies the options file you want to use when you start a session.	**dsmc.exe**	170
pick	Displays a list of files from which you can select files to delete, restore, or retrieve.	**delete archive** **expire** **restore** **retrieve**	171
pitdate	Specifies the file backup date to use when you select files to restore. Use with the ***pittime*** option.	**query backup** **restore**	172
pittime	Specifies a point-in-time on the specified date. Use with the ***pitdate*** option. This option is ignored if the ***pitdate*** option is absent.	**query backup** **restore**	173
preservepath	Specifies how the restore directory path is built.	**restore** **restore backupset** **retrieve**	174
todate	Sets a date limit for files. Tivoli Storage Manager does not include files that are processed after this date. Use with the ***totime*** option.	**query archive** **query backup** **restore** **retrieve**	177
totime	Specifies an ending time on the specified date. Use with the ***todate*** option. This option is ignored if the ***todate*** option is absent.	**query archive** **query backup** **restore** **retrieve**	178
v2archive	Use this option with the **archive** command to archive only files and not directories to the server.	**archive**	179
volinformation	Backs up or restores volume restrictions, such as volume or disk space restrictions, and trustee directory assignments for the root directory of a volume.	**archive** **incremental** **selective**	180

Command Line Options Reference

The following sections contain detailed information about each of the Tivoli Storage Manager command line options. These options are arranged in alphabetical order. Information for each option includes:

- A description of the option.
- A syntax diagram of the option. The option name is shown in a combination of uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the option name. See "Reading Syntax Diagrams" on page xii for an explanation of these diagrams.
- Detailed descriptions of the option parameters. If the parameter is a constant (a value that does not change), the minimum abbreviation is shown in uppercase letters.
- Examples of using the option on the command line.

Archmc

The ***archmc*** option specifies the available management class for your policy domain to which you want to bind your archived files.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

managementclass
Specifies an available management class in the active policy set of your policy domain. This management class overrides the default management class for the files you are archiving.

Examples

Command line:

```
dsmc archive –archmc=ret2yrs t3\sys:plan/proj1/budget.jan
```

Deletefiles

Use the ***deletefiles*** option with the **archive** command to delete files from your workstation after you archive them.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc archive small:\testdir\* -deletefiles
```

Description

The ***description*** option assigns or specifies a description for files when performing archive, delete, retrieve, or query archive operations. For example, if you want to archive a file named budget.jan and assign to it the description **2002 Budget for Proj 1**, you would enter:

```
dsmc archive –des="2002 Budget for Proj 1" t3\sys:plan/
proj1/budget.jan
```

You can also use this option to specify the description of a backup set that you want to query.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

description
Assigns a description to the file you are archiving. If you do not specify a description, the default is **archive date:***x*, where *x* is the current system date.

If you use the **archive** command to archive more than one file, the description you enter applies to each file. For example, to archive a group of files and assign the same description, *Project X*, to each file, you would enter:

```
dsmc archive –description="Project x"
t3\sys:allproj/*.x
```

You can then use the description to retrieve all of the files.

Examples

Command line:

```
dsmc archive –des="2002 Budget  for Proj 1"
```

Detail

The ***detail*** option displays detailed information about each management class in your active policy set. If you do not use the ***detail*** option, only the management class name and a brief description displays. If you specify the ***detail*** option, information about attributes in each copy group contained in each management class will display. A management class can contain a backup copy group, an archive copy group, both, or neither.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc query mgmtclass -detail
dsmc query filespace -detail
```

Dirsonly

The ***dirsonly*** option processes directories *only*. The client does not process files.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc query backup -dirsonly sys:*
```

Filelist

Use the ***filelist*** option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. With the exception of the **restore** and **retrieve** commands, when you use the ***filelist*** option, Tivoli Storage Manager ignores all other file specifications on the command line.

Note: The Tivoli Storage Manager Client API does not support this option.

The files (entries) listed in the filelist must adhere to the following rules:
- Each entry must be a fully qualified path to a file or directory. Specify only fully qualified paths.
- Each entry must be on a new line.
- Do *not* use wildcard characters.
- Each entry results in the processing of only one object (file or directory).
- If the file name contains any spaces, enclose the file name with quotes.
- Tivoli Storage Manager ignores any entry that is not valid.

The following is an example of a list of files and directories within a filelist:

```
serverb\sys:/proj/dir/file1
serverb\sys:/public/tivoli/file2
serva\sys:/acctng/avi/dir1
serva\sys:/books/dir2/file3
"e\sys:/dir/Ha Ha Ha/file.txt"
"e\sys:/messages/file.txt"
```

If an entry in the filelist indicates a directory, only that directory will process and not the files within the directory.

If the file name (the `filelistspec`) you specify with the ***filelist*** option does not exist, the command fails. Tivoli Storage Manager skips any entries in the filelist that are not valid files or directories. Tivoli Storage Manager logs errors and processing continues to the next entry.

Use file specifications with the **restore** and **retrieve** commands to denote the destination for the restored filelist entries. For example, in the **restore** command:

```
dsmc restore -filelist=sys:u/projecta/files vol1:u/dir1/record/ -preservepath=complete
```

the file specification `vol1:u/dir1/record/` represents the restore destination for all entries in the filelist. However, in the **selective** command:

```
dsmc selective -filelist=sys:u/projecta/files vol1:u/dir1/record/
```

the file specification `vol1:u/dir1/record` is ignored.

If you specify a directory in a filelist for the **delete archive** command, the directory is not deleted. Filelists that you use with the **delete archive** command should not include directories.

The entries in the list will be processed in the order they appear in the filelist. For optimal processing performance, pre-sort the filelist by file space name and path.

Note: Tivoli Storage Manager may back up a directory twice if the following conditions exist:
- The filelist contains an entry for the directory
- The filelist contains one or more entries for files within that directory

- No backup of the directory exists

For example, your filelist includes the entries `sys:proj/myfile` and `sys:proj`. If the `proj` directory does not exist on the server, the `sys:proj` directory is sent to the server a second time.

Syntax

Parameters

filelistspec
Specifies the location and name of the file that contains the list of files to process with the command.

Note: When you specify the ***filelist*** option on the command line, you cannot use the ***subdir*** option.

Examples

Command line:

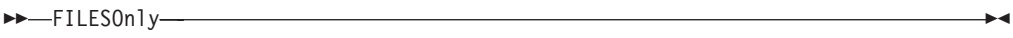
```
dsmc sel -filelist=serva\sys:avi/filelist.txt
```

Filesonly

The ***filesonly*** option restricts backup and restore processing to files *only*. You cannot restore or retrieve directories from the server when using the ***filesonly*** option with the **restore** or **retrieve** commands. However, directories with default attributes are created, if required, as placeholders for files that you restore or retrieve.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax



Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc incremental -filesonly sys:*
```

Fromdate

The ***fromdate*** option specifies a date from which you want to search for backed up or archived files. Files that were backed up or archived before this date are not included, although older directories might be included, if necessary, to restore or retrieve the files.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

date
Specifies the date from which you want to search for backup copies or archived files. Enter the date in the format you selected with the ***dateformat*** option.

When you include ***dateformat*** with a command, it must precede the ***fromdate***, ***pitdate***, and ***todate*** options.

Examples

Command line:

```
dsmc query backup -fromdate=12/11/2002 sys:proj/h3.doc
```

Fromnode

The ***fromnode*** option permits one node to perform commands for another node. A user on another node must use the **set access** command to permit you to query, list, restore, or retrieve files for that other node.

Syntax

Parameters

node
Specifies the node name on a workstation or a file server whose backup copies or archived files you want to access.

Examples

Command line:

```
dsmc query archive -fromnode=bob  -subdir=yes sys:*
```

Fromtime

Use the ***fromtime*** option with the ***fromdate*** option to specify a beginning time from which you want to search for backed up or archived files. Tivoli Storage Manager ignores this option if you do not specify the ***fromdate*** option.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

time
Specifies a beginning time on a specific date from which you want to search for backed up or archived files. If you do not specify a time, the time defaults to 23:59:59. Specify the time in the format you selected with the ***timeformat*** option.

When you include the ***timeformat*** option in a command, it must precede the ***fromtime***, ***pittime***, and ***totime*** options.

Examples

Command line:

```
dsmc q b -timeformat=4 -fromt=11:59AM -fromd=06/30/99 -tot=11:59PM
-tod=06/30/99
```

Ifnewer

The ***ifnewer*** option replaces an existing file with the backup if the backup is newer than the existing file. Only active backups are considered unless you also use the ***inactive*** or ***latest*** options.

Note: This option is ignored if the ***replace*** option is set to *No*.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc restore -ifnewer sys:u/id/projb/
```

Inactive

Use the ***inactive*** option with the **restore** and **query backup** commands, and the ***pick*** option to display both active and inactive objects.

You can also use the ***pick*** option to display backup versions and archive copies that match the file specification you enter.

Only active backups are considered unless you also use either the ***inactive*** or the ***latest*** option.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc restore -inactive sys:u/id/projecta/
```

Incrbydate

Note: If you have limited time during the week to perform backups, but extra time on weekends, you can maintain current server storage of your NetWare server files by performing an incremental backup with the ***incrbydate*** option on weekdays and a full incremental backup on weekends.

Use the ***incrbydate*** option with the **incremental** command to back up new and changed files with a modification date later than the last incremental backup stored at the server, unless the file is excluded from backup. Files added at the client after the last incremental backup, but with a modification date earlier than the last incremental, are not backed up.

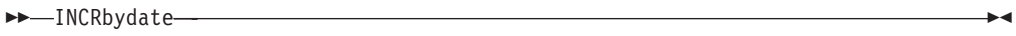
An incremental-by-date updates the date and time of the last incremental at the server. If an incremental-by-date is performed on only part of a file system, the date of the last full incremental is not updated and the next incremental-by-date will back up these files again.

Both full incrementals and incrementals-by-date back up new and changed files. An incremental-by-date takes less time to process than a full incremental and requires less memory. However, unlike a full incremental, an incremental-by-date does not maintain current server storage of *all* your NetWare server files because:

- It does not expire backup versions of files that are deleted from the NetWare server.
- It does not rebind backup versions to a new management class if the management class has changed.
- It does not back up files with attributes that have changed unless the modification dates and times have also changed, such as Access control list (ACL) data.
- It ignores the copy group frequency attribute of management classes.
- It does not handle name space changes on the volume.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax



Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc incremental -incrbydate
```

Latest

Use the ***latest*** option with the **restore** command to restore the most recent backup version of a file, even if the backup is inactive. Only active versions are considered for a restore unless you use either the ***inactive*** or the ***latest*** option.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc restore -latest sys:u/devel/projecta/
```

Location

The ***location*** option specifies where Tivoli Storage Manager searches for the backup set for a query or restore operation. You can use this option to locate backup sets on the server or local files.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

server
Specifies that Tivoli Storage Manager searches for the backup set on the server. This is the default.

file Specifies that Tivoli Storage Manager searches for the backup set file(s) on a local file system. Specify the file name in DOS, NFS, or FTAM format.

Examples

Command line:

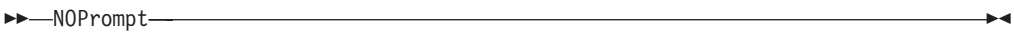
```
dsmc restore backupset mybackupsetname -loc=server
```

Noprompt

The ***noprompt*** option suppresses the confirmation prompt that normally appears before you delete an archived file, or when performing an image restore operation. Using this option can speed up the delete procedure. However, it also increases the danger of accidentally deleting an archived file that you want to save. ***Use this option with caution.***

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax



Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc delete archive sys:\test\* -noprompt
```

Optfile

The ***optfile*** option specifies the client options file you want to use when you start a Tivoli Storage Manager session.

Syntax

Parameters

file_name
Specifies an alternate client options file, if you use the fully qualified path name. If you specify only the file name, Tivoli Storage Manager assumes you want the current directory. The default is `dsm.opt`.

Examples

Command line:

```
dsmc query session -optfile=sys:tsm/spike.opt
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Pick

The ***pick*** option creates a list of backup versions or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the ***inactive*** option to view both active and inactive objects.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

There are no parameters for this option.

Examples

Command line:

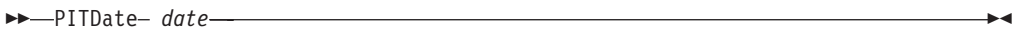
```
dsmc restore sys:project/* -pick -inactive
```

Pitdate

Use the ***pitdate*** option with the ***pittime*** option to establish a point in time for which you want to display or restore the latest version of your backups. Files that were backed up *on or before* the date and time you specified, and which were not deleted *before* the date and time you specified, are processed. Backup versions that you create after this date and time are ignored.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax



Parameters

date
Specifies the appropriate date. Enter the date in the format you selected with the ***dateformat*** option.

When you include ***dateformat*** with a command, it must precede the ***fromdate***, ***pitdate***, and ***todate*** options.

Examples

Command line:

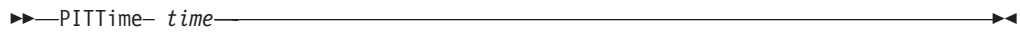
```
dsmc restore sys:\test\* -pitdate=08/01/2002
```

Pittime

Use the ***pittime*** option with the ***pitdate*** option to establish a point in time for which you want to display or restore the latest version of your backups. Files that were backed up *on or before* the date and time you specify, and which were not deleted *before* the date and time you specify, are processed. Backup versions that you create after this date and time are ignored. This option is ignored if you do not specify ***pitdate*** option.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax



Parameters

time
Specifies a time on a specified date. If you do not specify a time, the time defaults to 23:59:59. Specify the time in the format you selected with the ***timeformat*** option.

When you include the ***timeformat*** option in a command, it must precede the ***fromtime***, ***pittime***, and ***totime*** options.

Examples

Command line:

```
dsmc query backup sys:\test\* -pitt=06:00:00 -pitd=08/01/2002
```

Preservepath

The ***preservepath*** option specifies how much of the source path to reproduce as part of the target directory path when you restore or retrieve files to a new location. Use the ***-subdir***=*yes* option to include the entire subtree of the source directory (directories and files below the lowest-level source directory) as source to be restored. If a required target directory does not exist, it is created. If a target file has the same name as a source file, it is overwritten. Use the ***-replace***=*prompt* option to have Tivoli Storage Manager prompt you before files are overwritten.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

subtree
Creates the lowest-level source directory as a subdirectory of the target directory. Files from the source directory are stored in the new subdirectory. This is the default.

complete
Restores the entire path, starting from the root, into the specified directory. The entire path includes all the directories *except* the file space name.

nobase
Restores the contents of the source directory without the lowest level, or base directory, into the specified destination directory.

none
Restores all selected source files to the target directory. No part of the source path at or above the source directory is reproduced at the target.

If you specify ***subdir***=*yes*, Tivoli Storage Manager restores all files in the source directories to the single target directory.

Examples

Command line:
For the examples below, assume the server file space contains the following backup copies:

```
sys:h1/m1/file.a
sys:h1/m1/file.b
sys:h1/m1/l1/file.x
sys:h1/m1/l1/file.y
```

This command:

```
dsmc res sys:h1/m1/ sys:ann/
-preser=complete
```

Restores these directories and files:

```
sys:ann/h1/m1/file.a
sys:ann/h1/m1/file.b
```

This command:

```
dsmc res sys:h1/m1/ sys:ann/
-preser=nobase
```

Restores these directories and files:

```
sys:ann/file.a
sys:ann/file.b
```

This command:

```
dsmc res backupset sys:\h1\m1\ sys:\ann\
-su=yes -preser=nobase -loc=file
```

Restores these directories and files:

```
sys:ann\file.a
sys:ann\file.b
sys:ann\file.x
sys:ann\file.y
```

This command:

```
dsmc res sys:h1/m1/ sys:ann/
-preser=subtree
```

Restores these directories and files:

```
sys:ann/m1/file.a
sys:ann/m1/file.b
```

This command:

```
dsmc res sys:h1/m1/ sys:ann/
-preser=none
```

Restores these directories and files:

```
sys:ann/file.a
sys:ann/file.b
```

This command:

```
dsmc res sys:h1/m1/ sys:ann/ -su=yes
-preser=complete
```

Restores these directories and files:

```
sys:ann/h1/m1/file.a
sys:ann/h1/m1/file.b
sys:ann/h1/m1/l1/file.x
sys:ann/h1/m1/l1/file.y
```

This command:

```
dsmc res sys:h1/m1/ sys:ann/ -su=yes
-preser=nobase
```

Restores these directories and files:

```
sys:ann/file.a
sys:ann/file.b
sys:ann/l1/file.x
sys:ann/l1/file.y
```

This command:

```
dsmc res sys:h1/m1/ sys:ann/ -su=yes
-preser=subtree
```

Restores these directories and files:

```
sys:ann/m1/file.a
sys:ann/m1/file.b
sys:ann/m1/l1/file.x
sys:ann/m1/l1/file.y
```

This command:

```
dsmc res sys:h1/m1/ sys:ann/ -su=yes
-preser=none
```

Restores these directories and files:

```
sys:ann/file.a
sys:ann/file.b
sys:ann/file.x
sys:ann/file.y
```

Todate

Use the ***todate*** option with the ***totime*** option to specify an ending date and time. For example, you might request a list of files that were backed up before 11:59 PM on June 30, 2002.

Use the ***todate*** and ***totime*** options with the ***fromtime*** and ***fromdate*** options to request a list of backed up or archived files within a period of time. For example, you might request a list of files that were backed up between 6:00 AM on July 1, 2002 and 11:59 PM on July 30, 2002.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

date
Specifies an ending date. Enter the date in the format you selected with the ***dateformat*** option.

When you include ***dateformat*** with a command, it must precede the ***fromdate***, ***pitdate***, and ***todate*** options.

Examples

Command line:

```
dsmc restore sys:\test\* -todate=12/11/2002
```

Totime

Use the ***totime*** option with the ***todate*** option to specify an ending time on a specified date. For example, you might request a list of files that were backed up before 11:59 PM on June 30, 2002. Tivoli Storage Manager ignores this option if you do not specify the ***todate*** option.

Use the ***totime*** and ***todate*** options with the ***fromtime*** and ***fromdate*** options to request a list of files that were backed up within a period of time. For example, you might request a list of files that were backed up between 6:00 AM on July 1, 2002 and 11:59 PM on July 30, 2002.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax

Parameters

time
Specifies an ending time. If you do not specify a time, the time defaults to 23:59:59. Specify the time in the format you selected with the ***timeformat*** option.

When you include the ***timeformat*** option in a command, it must precede the ***fromtime***, ***pittime***, and ***totime*** options.

Examples

Command line:

```
dsmc restore sys:\test\* -totime=23:00:00 -todate=09/17/2002
```

V2archive

Use the ***v2archive*** option with the **archive** command to archive only files to the server. Tivoli Storage Manager will not process directories that exist in the path of the source file specification.

Note: Do not use the ***v2archive*** option when archiving the NDS.

This option differs from the ***filesonly*** option in that the ***filesonly*** option archives the directories that exist in the path of the source file specification.

The ***v2archive*** and ***dirsonly*** options are mutually exclusive and an error message displays if you use both options in the same **archive** command.

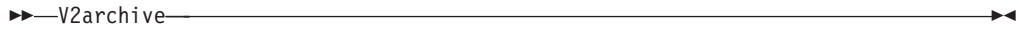
This option is not persistent; you must explicitly specify this option in each **archive** command.

If you use this option, you may want to consider the following:

- You may experience performance problems when retrieving large amounts of data archived with this option.
- You may want to use this option only if you are concerned about expiration performance on a server that already contains extremely large amounts of archived data.

Note: The Tivoli Storage Manager Client API does not support this option.

Syntax



Parameters

There are no parameters for this option.

Examples

This command:

```
dsmc archive sys:relx/dir1/ -v2archive -su=y.
```

Archives these files:

```
sys:relx/dir1/file1
sys:relx/dir1/file2
sys:relx/dir1/file3
sys:relx/dir1/dir2/file4
sys:relx/dir1/dir2/file5
```

Note: Tivoli Storage Manager does not archive `sys:relx/dir1` and `sys:relx/dir1/dir2`.

Volinformation

The ***volinformation*** option backs up or archives root-level information. For the NetWare file server, ***volinformation*** handles volume restrictions and volume root-level trustee information.

For NetWare directory services, ***volinformation*** handles the [root] container and NDS schema.

Specify ***volinformation*** either with the **selective** or the **archive** command, or any **incremental** command that does not target the entire volume. Entering the **incremental** command on an entire volume implicitly backs up the root-level information.

Syntax

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc selective sys:system\*.nlm -vol
```

The following examples send root-level information *to* the server:

```
dsmc sel sys: -vol
dsmc arch sys: -vol
dsmc incr sys:system -vol
dsmc incr sys: (implied)
dsmc sel dir -vol
dsmc arch dir -vol
dsmc incr dir:..o=adsm -vol
dsmc incr dir (implied)
```

The following commands send root-level information *from* the server:

```
dsmc restore sys:* -sub=yes
dsmc retrieve sys:* -sub=yes
dsmc restore dir:.* -sub=yes
dsmc retrieve dir:.* -sub=yes
```

Chapter 11. Using Commands

Tivoli Storage Manager provides a command line interface (CLI) that you can use as an alternative to the graphical user interface (GUI). This chapter describes how to start or end a client command session and how to enter commands. It also provides detailed information about each command. Table 27 shows a list of tasks related to entering commands.

Table 27. Entering Commands

Task	Page
Starting and Ending a Client Command Session	182
Entering Client Commands	183
Remembering Previous Commands	185
Using Wildcard Characters	186

Table 28 provides an alphabetical list of the commands, a brief description, and where to locate more information.

Table 28. Commands

Command	Description	Page
archive	Archives files from a workstation to Tivoli Storage Manager storage.	187
cancel restore	Displays a list of restartable restore sessions and permits you to select one to cancel.	188
delete access	Revokes authorization for a user to restore or retrieve files.	189
delete archive	Deletes archived files from Tivoli Storage Manager storage.	190
delete filespace	Deletes file spaces in Tivoli Storage Manager storage.	191
expire	Inactivates backup objects you specify.	192
help	Displays online command help.	193
incremental	Backs up new and changed files.	194
loop	Starts an interactive command session.	198
macro	Executes commands within a macro file you specify.	199
query access	Displays a list of current authorization rules.	200
query archive	Displays a list of archived files.	201
query backup	Displays a list of backup versions.	202
query backupset	Queries a backup set from the server or a local file.	203
query filespace	Displays a list of file spaces in Tivoli Storage Manager storage.	204
query inclexcl	Displays a list of include-exclude statements in the order in which they are processed during backup and archive operations.	205

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Table 28. Commands (continued)

Command	Description	Page
query mgmtclass	Displays information about available management classes.	206
query restore	Displays a list of your restartable restore sessions in the server database.	207
query schedule	Displays information about scheduled events.	208
query session	Displays information about the current session.	209
query tsa	Displays information about current TSA.	210
restart restore	Displays a list of restartable restore sessions and permits you to select one to restart.	213
restore	Restores backup versions from Tivoli Storage Manager storage.	214
restore backupset	Restores a backup set from the server or a local file.	216
retrieve	Retrieves archived files from Tivoli Storage Manager storage.	218
schedule	Starts the client scheduler on the workstation.	220
selective	Backs up selected files.	221
set access	Authorizes another user to access your backup versions or archive copies.	223
set password	Changes the Tivoli Storage Manager password for your workstation.	225

Starting and Ending a Client Command Session

You can start or end a client command session in either batch mode or interactive mode. Use batch mode when you want to enter a *single* client command. Tivoli Storage Manager processes the command and returns to the command prompt.

Use interactive mode when you want to enter a *series* of commands. Since Tivoli Storage Manager establishes connection to the server only once for interactive mode, a series of commands can process more quickly. Tivoli Storage Manager processes the commands and returns to the **tsm>** prompt.

Process Commands in Batch Mode

When you enter a *single* command in batch mode, precede it with the executable program name, **dsmc**. For example, to process the **incremental** command in batch mode, you would enter:

```
dsmc incremental
```

If a password is required, Tivoli Storage Manager prompts you each time you enter a command if the ***passwordaccess*** option is set to *prompt* and authentication on the server is set to *On*. Type your password and press Enter.

You can also enter your password using the ***password*** option with a command, but your password appears on the screen. For example, if your password is ***secret***, enter:

```
dsmc incremental –password=secret
```

If you set the ***passwordaccess*** option to *generate* in your `dsm.opt` file, you do not need to specify the password with the command. Tivoli Storage Manager *only* prompts you for your password if you are registering your workstation with a server or manually changing your password.

Process Commands in Interactive Mode

Use the *interactive* mode to enter a series of commands. Enter **dsmc** on the command line and press Enter. When the **tsm>** command prompt appears, type the command name and press Enter. *Do not* precede each command with the executable program name, **dsmc**. Alternatively, you can enter **dsmc loop** on the command line to start a client command session in interactive mode. **Loop** is the default command for **dsmc**.

If a password is required, Tivoli Storage Manager prompts you when you enter the first command. Type your password and press Enter. You can also enter your password using the ***password*** option with the **loop** command, but your password is displayed. For example, if your password is ***secret***, you would enter:

```
dsmc loop –password=secret
```

To end an interactive session, enter **quit** at the prompt.

Entering Client Commands

A client command can include one or more of these components:

- Command name
- Options
- Parameters

The sections that follow describe each of these components.

Command Name

The first part of a command is the command name. The command name consists of a single word, such as **help** or **schedule**, or an action word and an object for that action, such as **query archive**. Enter the full command name, or its minimum abbreviation. For example, you can enter any of the following versions of the **query schedule** command:

```
query schedule
q sc
q sched
query sc
```

Options

There are two groups of options that you can use with commands:

- **Client options**: The group of options that are set in your client options file (`dsm.opt`). To override an option in the client options file, enter the option with a command. For detailed information about client options, see Chapter 9, “Using Processing Options” on page 69.
- **Client command options**: Use this group of options with specific commands on the command line *only*. Table 26 on page 149 provides an alphabetical list of the command–line options, a brief description, and the commands with which they are used.

Parameters

Commands can have required parameters, optional parameters, or no parameters at all. Required parameters provide information to perform a task. The most commonly required parameter is a file specification. For example, if you want to archive a file named `budget` from the `project` directory, you would enter:

```
dsmc archive t3\sys:project/budget
```

It is unnecessary to enter the NetWare server name from which you are working.

Some commands have optional parameters. If you do not enter a value for an optional parameter, Tivoli Storage Manager uses the default value. For example, the **restore** command includes a required parameter, *sourcefilespec*, that specifies the path and file name in storage that you want to restore. The optional parameter, *destinationfilespec*, specifies the path and file name where you want to place the restored files. If you do not specify the *destinationfilespec*, by default Tivoli Storage Manager restores the files to the original source path. If you want to restore the files to a *different* directory, enter a value for *destinationfilespec*. For example, to restore `nw1\sys:project/budget` to `nw2\sys:newproj/planning`, you would enter:

```
dsmc restore nw1\sys:project/budget nw2\sys:newproj/planning
```

Enter parameters in the order indicated in the command syntax diagram.

File Specification Syntax

Use the following syntax rules when entering file specification parameters, such as *filespec*, *sourcefilespec*, and *destinationfilespec*:

- The only command that accepts a simple file space name is the **incremental** command. The following example is valid:

  ```
  dsmc i sys:
  ```

  The following example is *not* valid:

  ```
  dsmc sel sys:
  ```

- When entering the *sourcefilespec*, if the directory name ends with **/**, then **/*** is implied.

  When entering a *destinationfilespec*, if the name ends with **/**, then it is considered a directory, otherwise it is considered a file.

  The following example illustrates these two rules. Even though `mydir` and `yourdir` are directories, the command will fail because `/*` is implied after `mydir`, and `yourdir` is considered a file:

  ```
  restore sys:mydir/ sys:away/yourdir
  ```

  The following example illustrates the second rule. Even though `mydir` and `yourdir` are directories, the command will fail because `mydir` and `yourdir` are considered files:

  ```
  restore sys:mydir sys:away/yourdir
  ```

- Do not use wildcards as part of the file space name or anywhere in the *destinationfilespec*. The one exception to this rule is the **set access** command where wildcards are permitted in the two lowest-levels of the file spec. For example, use the following command to grant access to all files in and below the `sys:dir1` directory:

  ```
  dsmc set access sys:/dir1/*/*
  ```

- The maximum number of characters for a file name is 256. The maximum number of characters for a path name is 512 characters.

- The maximum number of file specifications per command:
  - The Query commands can accept only one file specification.
  - The **restore** and **retrieve** commands can accept a *sourcefilespec* and a *destinationfilespec*.
  - The **archive**, **delete archive**, **incremental**, and **selective** commands will accept up to 20 file specifications.

  Separate file specifications with a blank space.

Note: You can overcome these limitations by using the ***filelist*** option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 158 for more information.

Maximum File Size for Operations

The maximum file size for backup, restore, archive, and retrieve operations is 4,294,963,200 (4GB -4KB). Netware 5.x and Netware 6 clients support a maximum file size greater than 4 GB on NSS volumes, and the ability to backup or restore directory space limitations.

Remembering Previous Commands

If you set the ***editor*** option to *yes* in your client options file `dsm.opt`, Tivoli Storage Manager permits you to recall and edit as many as 20 previously entered commands by using the Up arrow and Down arrow keys. If you set the ***editor*** option to *no*, the feature to recall previous commands is not active. If the editor and command retrieve functions are not working on a specific workstation setting, you should turn off the ***editor*** option. For more information regarding the ***editor*** option, see "Editor" on page 89.

Pressing the Up arrow key displays the previous command in memory. Pressing the Down arrow key displays the next command in memory. Table 29 lists other functions you can perform when you recall commands.

Table 29. Command Recall and Edit Functions

Function	Press
Display the previous command in memory.	Up arrow
Display the next command in memory.	Down arrow
Move to the beginning of the command.	Home
Move to the end of the command.	End
Move to the left.	Left arrow
Move to the right.	Right arrow
Move five spaces to the right.	Tab right
Delete a character to the right of the cursor.	Delete
Delete a character to the left of the cursor.	Backspace
Insert a character.	Toggle the Insert key
Finish or execute the command.	Enter
Clear the current line.	Esc
End the program.	CTRL-C
End the program.	QQ (Scheduler or Incremental Backup/Restore)

Using Wildcard Characters

In a command, you can use wildcard characters in the file name or file extension *only*. You cannot use them to specify destination files, volume names, server names, or NDS names. Use wildcard characters when you want to specify multiple files with similar names in *one* command. Without wildcard characters, you must repeat the command for each file. Valid wildcard characters that you can use include:

***** Asterisk. Matches zero or more characters.

? Question mark. Matches any single character at the present position.

Table 30 shows examples of each wildcard.

Table 30. Wildcard Characters

Pattern	Matches	Does Not Match
Asterisk (*)		
ab*	ab, abb, abxxx	a, b, aa, bb
ab*rs	abrs, abtrs, abrsrs	ars, aabrs, abrss
ab*ef*rs	abefrs, abefghrs	abefr, abers
abcd.*	abcd.c, abcd.txt	abcd, abcdc, abcdtxt
Question Mark (?)		
ab?	abc	ab, abab, abzzz
ab?rs	abfrs	abrs, abllrs
ab?ef?rs	abdefjrs	abefrs, abdefrs, abefjrs
ab??rs	abcdrs, abzzrs	abrs, abjrs, abkkkrs

Entering Commands

Follow the general rules below when you enter commands:

- Enter a maximum of 80 characters on the command line. Enter the characters in a continuous string. If you press the return key, the command will process.
- When you enter options with a command, always precede the option with a dash (–).
- Enter more than one option in any order in a command before or after the file specification. Separate multiple options with a blank space.

Client Commands Reference

The following sections contain detailed information about each of the Tivoli Storage Manager commands. These commands are arranged in alphabetical order. Information for each command includes:

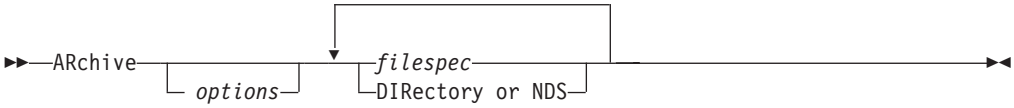
- A description of the command.
- A syntax diagram of the command. The command name is shown in a combination of uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the command name. See "Reading Syntax Diagrams" on page xii for an explanation of these diagrams.
- Detailed descriptions of the command parameters. If the parameter is a constant (a value that does not change), the minimum abbreviation is shown in uppercase letters.
- Examples of using the command.

Archive

The **archive** command archives a single file, selected files, or all files in a directory and its subdirectories on a server.

Archive files that you want to preserve in their current condition. To release storage space on your workstation, delete files as you archive them using the ***deletefiles*** option. Retrieve the archived files to your workstation whenever you need them again.

Syntax



Parameters

options
You can use these command line options with the **archive** command: ***archmc, deletefiles, description, dirsonly, filelist***, and ***volinformation***. For more information about command line options, see Chapter 10, "Using Options with Commands" on page 149.

You can use the ***changingretries*** and ***subdir*** common options with the **archive** command. See Chapter 9, "Using Processing Options" on page 69 for information about these common options.

filespec
Specifies path and name of the file you want to archive. You can use wildcards to specify groups of files or all the files in a directory. You can also enter up to 20 file specifications in a command. See "Maximum File Size for Operations" on page 185 for the maximum file size for archive processing.

DIRectory or NDS
Specifies that you want to archive the NDS.

Examples

Task Archive a single file named `budget`.

Command: `dsmc archive t9\sys:user/proj1\budget`

Task Archive all files in the `t9\sys:plan/proj1` directory that contain a file extension of `.txt`.

Command: `dsmc archive t9\sys:plan/proj1/*.txt`

Task Archive all files in the `t9\sys:home` directory.

Command: `dsmc archive t9\sys:home/*`

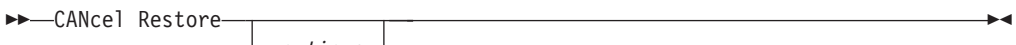
Cancel Restore

The **cancel restore** command displays a list of your restartable restore sessions in the server database. You can select zero or more restartable restore sessions that you want to cancel. To restart restartable restore sessions, use the **restart restore** command.

Use the **cancel restore** command when:

- You cannot back up files affected by the restartable restore.
- Restartable restore sessions lock the file space so that files cannot be moved off sequential volumes.

Syntax



Parameters

options
See Chapter 9, "Using Processing Options" on page 69 for information about common options that you can use with the **cancel restore** command.

Examples

Task Cancel a restore operation.

Command: `dsmc cancel restore`

Delete Access

The **delete access** command deletes authorization rules for files that are stored on the server. When you delete an authorization rule, you revoke user access to any files specified by that rule.

Syntax

Parameters

options
For information about common options that you can use with this command, see Chapter 9, "Using Processing Options" on page 69.

Examples

Task Display a list of current authorization rules and select the rules you want to delete.

Command: `dsmc delete access`

See the following screen example:

```
Index  Type       Node     User   Path
_____  _____      _____________________________
1      Backup     node1     *     mo\sys:u/dev/proja/list
2      Backup     node4     *     mo\sys:u/plan/exp/deptc
4      Archive    node5     *     mo\sys:u/mfg/inv/parta
Enter Index of rule(s) to delete, or quit to cancel:
```

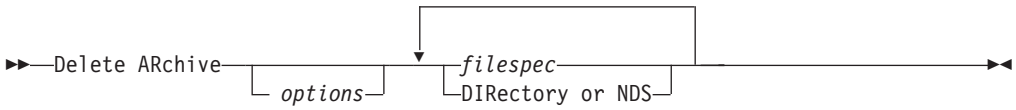
To delete the authorization rules that allow *node4* and *node5* to access your files, type **2 4** or **(2,4)** (your selections can be separated by commas or spaces). Then press Enter. Quit without making a selection by entering **quit**.

Delete Archive

The **delete archive** command deletes archived files from server storage. Your administrator must give you authority to delete archived files.

Attention: When you delete archived files, ***you cannot retrieve them.*** Verify that the files are obsolete *before* you delete them.

Syntax



Parameters

options
You can use these command line options with the **delete archive** command: ***description***, ***filelist***, ***noprompt***, ***pick***. For more information about command line options, see Chapter 10, "Using Options with Commands" on page 149.

You can use the ***subdir*** common option with the **delete archive** command. For information about common options, see Chapter 9, "Using Processing Options" on page 69.

filespec
Specifies the path and file name that you want to delete from storage. Use wildcard characters to specify a group of files or all files in a directory. You can also enter up to 20 file specifications in a command

DIRectory or NDS
Specifies that you want to delete the archived NDS.

Examples

Task Delete a file named `budget`.

Command: `dsmc del arch sys:user/plan/proj1/budget`

Task Delete all files archived from the `sys:user/plan/proj1` directory with a file extension of `.txt`.

Command: `dsmc del arch sys:user/plan/proj1/*.txt`

Task Delete files archived from the `sys:user/project` directory using the ***pick*** option.

Command: `dsmc d ar sys:user/project/* -pick`

Delete Filespace

The **delete filespace** command deletes file spaces from server storage. A *file space* is a logical space on the server that contains files you backed up or archived. Tivoli Storage Manager assigns a separate file space on the server for each workstation drive from which you back up or archive files. The file space name is the same as the drive label name. When you enter the **delete filespace** command, a list of your file spaces displays. From this list, select the file space that you want to delete.

Your administrator must give you authority to delete a file space. You need BACKDEL authority if the file space you want to delete contains backup versions, or ARCHDEL authority if the file space contains archive copies. If the file space contains *both* backup versions and archive copies, you need both types of authority.

Attention: When you delete a file space, you delete *all* backup versions and archive copies within that file space. When you delete a file space, ***you cannot restore the files***. Verify that the files are obsolete *before* you delete them.

Syntax

Parameters

options
You can use these common options with the **delete filespace** command: ***scrollprompt***, ***scrolllines***, ***nasnodename***. For more information, see Chapter 9, "Using Processing Options" on page 69.

Examples

Task Delete a file space.

Command: `dsmc delete filespace`

Expire

The **expire** command inactivates the backup objects you specify in the file specification or with the ***filelist*** option.

When working in interactive mode, a prompt notifies you before files are expired.

The **expire** command does not remove workstation files. If you expire a file or directory that still exists on your workstation, the file or directory is backed up again during the next incremental backup unless the object is excluded by include-exclude processing.

If you expire a directory that contains active files, those files will not appear in a subsequent query from the GUI. However, these files will display on the command line if you specify the proper query with a wildcard character for the directory.

Syntax

Parameters

options
You can use these command line options with the **expire** command: ***pick*** and ***filelist***. For more information about command line options, see Chapter 10, "Using Options with Commands" on page 149.

Note: If the user specifies ***filelist***, then ***pick*** is ignored.

filespec
Specifies a path and a filename that you want to expire. You can enter only one file specification on this command. However, you can use wildcards to select a group of files or all the files in a directory. If you specify the ***filelist*** option, the `filespec` designation is ignored.

Examples

Task Inactivate the `letter1.txt` file in the `sys:ann` directory.

Command: `dsmc expire sys:ann/letter1.txt`

Task Inactivate all files in the `admin/mydir` directory.

Command: `dsmc expire sys:admin/mydir/*`

Help

The **help** command displays a Table of Contents of help topics for the command line client. Enter the number of the topic that you want to view. If there is more than one screen of topics, scroll backward or forward through the list. To exit, type **q** and press Enter.

Syntax

Parameters

options
For information about common options that you can use with this command, see Chapter 9, "Using Processing Options" on page 69.

Examples

Task Display a list of help choices.

Command: `dsmc help`

Incremental

The **incremental** command backs up all new or changed files or directories in the default client domain or from NetWare volumes you specify, unless you exclude them from backup services. Tivoli Storage Manager also backs up file system trustee rights along with file data. It is not possible to restore only the trustee rights; they are restored as part of the file restore process.

You can incrementally back up an entire file space (domain) or just a single file. If you specify only the file space name, the entire directory tree is traversed. If you specify a directory, only that directory is backed up, unless you set the ***subdir*** option to *yes*. This is considered a partial incremental back up.

The following attributes in the management class assigned to the file or directory affect whether the data is actually backed up:

Frequency
The number of days that must elapse between successive backups for the file. Use this attribute during a full incremental backup.

Mode Permits you to back up only files that changed since the last backup (*modified*). Also permits you to back up the files whether they changed or not (*absolute*).

Serialization
Permits or denies backup of files or directories according to the following values:
- **static**: In order to be backed up, data must not be modified during backup or archive.
- **shared static**: If data in the file or directory changes during each of the allowed attempts to back up or archive it, it is not backed up or archived. The value of the ***changingretries*** option determines how many attempts are made. The default is 4.
- **dynamic**: The object is backed up or archived on the first attempt whether or not data changes during the process.
- **shared dynamic**: The object is backed up or archived on the last attempt, even if data changes during the process.

For more information on management classes, see Chapter 8, "Understanding Storage Management Policies" on page 59.

Using the ***include*** option in an include-exclude list, you can assign the default management class to a file. You can also assign a specific management class to a file.

You can perform either a *full incremental* backup or an *incremental by date* backup. The default is a full incremental backup.

You can also use the **selective** command to perform a *selective* backup that backs up only the files, directories or empty directories that you specify. For more information, see "Selective" on page 221.

A full incremental backs up all files or directories that are new or have changed since the last incremental backup. During a full incremental backup, the client queries the server to determine the exact condition of your storage. Tivoli Storage Manager uses this information to:
- Back up new files or directories.
- Back up files or directories whose contents have changed.

- Mark inactive backup versions on the server for files or directories that are deleted from the workstation.
- Rebind backup versions to management classes if the management class assignments change.

Incremental-by-Date

An incremental-by-date backup backs up new and changed files with a modification date later than the date of the last incremental backup stored at the server, unless the files are excluded from backup by an **exclude** statement.

If an incremental-by-date is performed on only part of a file system, the date of the last full incremental is not updated, and the next incremental-by-date will back up these files again. Use the **query filespace** command to determine the date and time of the last incremental backup of the entire file system.

To perform an incremental-by-date backup, use the ***incrbydate*** option with the **incremental** command.

Unlike a full incremental, an incremental-by-date does not maintain current server storage of *all* your NetWare server files because:

- It does not expire backup versions of files that are deleted from the NetWare server.
- It does not rebind backup versions to a new management class if the management class has changed.
- It does not back up files with attributes that have changed, unless the modification dates and times have also changed.
- It ignores the copy group frequency attribute of management classes.
- It does not handle name space changes on the volume.

For these reasons, if you have limited time during the week to perform backups, but extra time on the weekends, you can perform an incremental-by-date backup on weekdays and a full incremental backup on weekends to maintain current server storage of your NetWare server files.

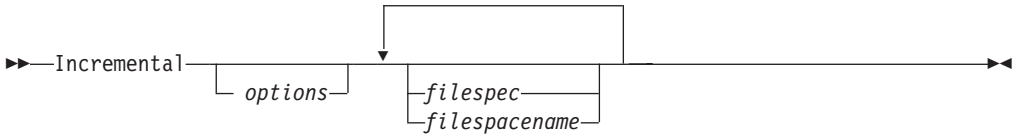
If you are running NetWare Btrieve on your NetWare server (or any other server-based database), stop the database application before backing up the files associated with the database. Many database applications place locks on files that can prevent Tivoli Storage Manager from backing them up. Because Tivoli Storage Manager is a Storage Management Services (SMS) backup application, it supports database Target Service Agents (TSAs) as soon as they are available. This allows Tivoli Storage Manager to maintain database integrity without manual interaction.

If Tivoli Storage Manager refuses to back up a file, check to see if it is marked for execute only or it is opened and locked by another user.

If the **incremental** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Tivoli Storage Manager attempted to transfer during *all* command attempts. Therefore, the statistics for bytes transferred may not match the file statistics, such as those for file size.

For information about backing up server specific information, see “Tivoli Storage Manager NetWare Backup and Recovery Guide” on page 227.

Syntax



Parameters

options
You can use these command line options with the **incremental** command: ***dirsonly, filelist, filesonly, incrbydate, volinformation***. For more information, see Chapter 10, "Using Options with Commands" on page 149.

You can use these common options with the **incremental** command: ***changingretries***, ***domain***, , ***memoryefficientbackup***, ***subdir***, , ***tapeprompt***. For information about these options, see Chapter 9, "Using Processing Options" on page 69.

filespec
Specifies the path and file name that you want to back up. Use wildcards to select a group of files, all the files in a directory, all objects in a directory branch, or all objects in a volume. You can also enter up to 20 file specifications in a command by separating the file specifications with a space. If you do not specify a file specification, the default domain or the domain specified as an option is backed up. See "Maximum File Size for Operations" on page 185 for the maximum file size for back up processing.

If you specify a volume, all new and changed files are backed up. In addition, the last incremental date for the file space is updated on the server. If you specify a file or directory, the last incremental date is not updated. This means the file or directory might be backed up again if a later backup is performed using the ***incrbydate*** option.

If you specify a volume, specify the volume without a trailing slash.

filespacename
Specifies the file space name on the server that contains the files you want to back up.

Examples

Task Run an incremental backup of the default client domain specified in your client options file (`dsm.opt`).

Command: `dsmc Incremental`

Task Run a full incremental backup for the `sys:` volume, the `data:` volume on server **b9**.

Command: `dsmc i b9\sys: b9\data: b9\bind:`

Task Run a partial incremental backup.

Command: `dsmc inc vol:system/*`

Task Run a partial incremental backup by date using the ***incrbydate*** option.

Command: `dsmc inc -incrbydate`

Task Incrementally back up the NDS.

Command: `dsmc inc nds:`

Task Run an incremental backup remotely for the `sys:` volume on server **b9**.

Command: `dsmc inc b9\sys:`

Task Run a partial incremental backup of the NDS.

Command: `dsmc inc nds:.o=ann.*`

Loop

The **loop** command starts an interactive command line session that is maintained until you enter **quit**. In an interactive command line session, it is unnecessary to precede each command name with **dsmc** and your password, if one is required. After you start an interactive session, most of the options you enter with other commands are in effect throughout the session, unless you enter them again using a different setting.

You can enter all valid commands in interactive mode *except* the **schedule** and **loop** commands.

There are some options that you cannot use in the interactive session created by the **loop** command and are identified in the option description by this statement: *This option is valid only on the initial command line. It is not valid in interactive mode.*

See Chapter 9, "Using Processing Options" on page 69 for options that you cannot use in interactive mode.

Syntax

Parameters

options
For information about command line and common options that you can use with this command, see Chapter 10, "Using Options with Commands" on page 149 and Chapter 9, "Using Processing Options" on page 69.

Examples

Task Start an interactive command line session.

Command: `dsmc loop`

At the **tsm>** prompt, enter a command.

There are three methods for ending an interactive session:
- Enter quit
- Press the Escape key, and then enter QQ
- If other commands fail, enter the following keystroke combination: "QQ".

Macro

The **macro** command executes a series of commands that you specify in a macro file. By including the **macro** command within a macro file, you can nest as many as ten levels of commands.

Comment lines are not supported within the macro file that you specify for the **macro** command.

Syntax

Parameters

macroname
Specifies the fully qualified name of the file containing the commands.

Examples

The following is an example of how to use the **macro** command.

Task Selectively back up files in the following directories:

```
sys:project/proja
sys:project/projb
sys:project/projc
```

Command: `macro sys:tsm/backabc.mac`

where `backabc.mac` contains the following statements:

```
sel sys:devel/project/proja/*
sel sys:devel/project/projb/*
sel sys:devel/project/projc/*
```

Query Access

The **query access** command displays a list of nodes to whom you have given access to backup versions or archive copies of specific files. Tivoli Storage Manager displays a list of authorization rules that you defined with the **set access** command. The information includes:

- Authority you gave a node to restore backup versions or retrieve archive copies.
- The user(s) to whom you gave authorization.
- The files to which the node has access.

Syntax

Parameters

options
You can use the following common options with the **query access** command: ***scrolllines, scrollprompt***. For more information about common options you can use with this command, see Chapter 9, "Using Processing Options" on page 69.

Examples

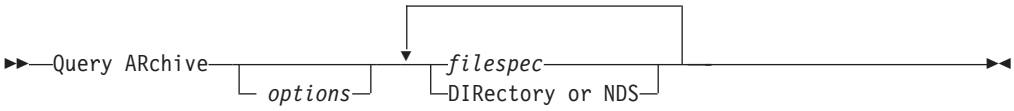
Task Display a list of nodes who have access to your files.

Command: `dsmc query access`

Query Archive

The **query archive** command displays a list of your archived files, the file size, archive date, file specification, expiration date, and file description.

Syntax



Parameters

options
You can use these command line options with the **query archive** command: ***description, dirsonly, filelist, filesonly, fromdate, fromnode, fromtime, todate, totime***. For more information, see Chapter 10, "Using Options with Commands" on page 149.

You can use these common options with the **query archive** command: ***scrolllines***, ***scrollprompt***, ***subdir***. See Chapter 9, "Using Processing Options" on page 69 for more information..

filespec
Specifies the path and file name that you want to query. Use wildcard characters to specify a group of files or all the files in a directory.

DIRectory or NDS
Displays a list of archived NDS files.

Examples

Task Display a list of all your archived files in the `servera\sys:` volume.

Command: `dsmc q ar –sub=y servera\sys:*`

Task Display a list of all your archived files on `servera\sys:`. Use the ***dateformat*** and ***timeformat*** options to reformat the dates and times.

Command: `dsmc q ar –sub=yes –date=5 –time=4 servera\sys:*`

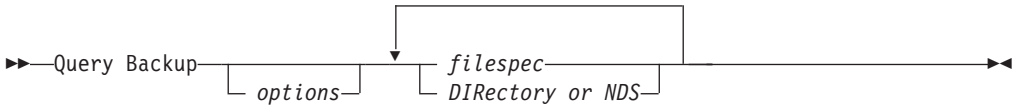
Task Display a list of archived files in the `servera\sys:u/proj` directory whose first four characters of the file name begin with `proj`. Use the ***dateformat*** and ***timeformat*** options.

Command: `dsmc q ar –date=1 –time=4 servera\sys:uproj/proj*`

Query Backup

The **query backup** command displays a list of backup versions of your files. File information includes the file specification, size, backup date, whether the file is active or inactive, and the management class assigned to the file. Only the first ten characters of the management class name are displayed.

Syntax



Parameters

options
You can use these command line options with the **query backup** command: ***dirsonly, filelist, filesonly, fromdate, fromnode, fromtime, todate, totime***. For more information, see Chapter 10, "Using Options with Commands" on page 149.

You can use these common options with the **query backup** command: ***subdir***, ***scrolllines, scrollprompt***. See Chapter 9, "Using Processing Options" on page 69 for information about these common options.

filespec
Specifies the path and file name that you want to query. Use wildcard characters to specify a group of files or all the files in a directory.

DIRectory or NDS
This parameter displays a list of backed up NDS objects. To display a list of the entire directory, specify `directory:` or `directory:*`. To display a list of only one container in the directory, specify `directory:.o=container_name`. In all examples, *nds:* instead of *dir:* may be entered.

Examples

Task Display a list of all your backed up files on the `sys:` volume.

Command: `dsmc q backup -su=y serva\sys:*`

Task Display a list of all your backed up files. Use the ***dateformat*** and ***timeformat*** options.

Command: `dsmc q b –date=1 –time=4 –su=y serva\sys:*`

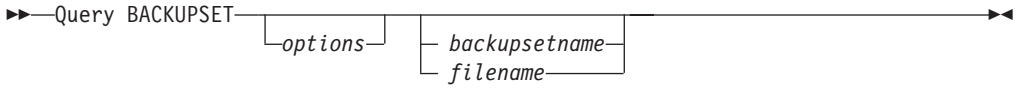
Task Display a list of files that were backed up from the `serva\sys:proj` directory with file names that begin with `proj`. Use the ***dateformat*** and ***timeformat*** options.

Command: `dsmc q b -date=1 -time=4 serva\sys:proj/proj*`

Query Backupset

The **query backupset** command queries a backup set from a local file or the server. This command displays the backup set name, generation date, retention, and description.

Syntax



Parameters

options
You can use these command line options with the **query backupset** command: ***description*** and ***location***. See Chapter 10, "Using Options with Commands" on page 149 for information about these command line options.

You can use these common options with the **query backupset** command: ***scrolllines*** and ***scrollprompt***. See Chapter 9, "Using Processing Options" on page 69 for information about these common options.

backupsetname
Specifies the name of the backup set on the server you want to query when *-**location**=server* is in effect. You can use wildcards to specify the backup set name. If you do not specify a backup set name, all backup sets display.

filename
Specifies the file name on your local workstation that contains the backup set you want to query when *-**location**=file* is in effect.

Examples

Task Query a backup set on the server called `mybackupsetname` on the server.

Command: `dsmc query backupset mybackupsetname -loc=server`

Task Query the backup set in the `backupsetfile.name` file in the `budget` directory.

Command: `dsmc query backupset sys:u/budget /backupsetfile.name -loc=file`

Query Filespace

The **query filespace** command displays a list of file spaces for a node stored on the server. A *file space* is a logical space on the server that contains files you backed up or archived. Tivoli Storage Manager assigns a separate file space on the server for each node at your workstation from which you back up or archive files.

Syntax

Parameters

options

You can use the ***fromnode***, ***detail*** command line options with the **query filespace** command. For more information, see "Fromnode" on page 162, "Detail" on page 156.

You can use the ***nasnodename***, ***scrolllines*** and ***scrollprompt*** common options with the **query filespace** command. See Chapter 9, "Using Processing Options" on page 69 for more information..

Examples

Task Display your file spaces.

Command: `dsmc query filespace`

Task Display your file spaces. Use the ***dateformat*** and ***timeformat*** options to reformat the dates and times.

Command: `dsmc query filespace –date=5 –time=4`

Query Inclexcl

The **query inclexcl** command displays a list of include-exclude statements in the order in which they are processed during backup and archive operations. The list displays the type of option, the scope of the option (archive, all, etc.), and the name of the source file.

You can test the validity of patterns you wish to use in your include-exclude list before you actually insert them in your options file. See the *test pattern* explanation below.

Syntax

Parameters

test pattern
Use for testing the validity of patterns you wish to use in your include-exclude list. When you use a test pattern with this command, the following occurs:

- The internal include-exclude list is *not* displayed
- The pattern is processed as if it had come from an include-exclude statement, including all the usual error checking
- The pattern is displayed as it would appear in the include-exclude list

If the test pattern has no errors, the compiled pattern result is the same as the test pattern.

Examples

Task Display a list of include-exclude statements.

Command: `dsmc query inclexcl`

Task Test the validity of this pattern: `/.../?x?/*.log`

Command: `dsmc query inclexcl sys:/.../?x?/*.log`

Query Mgmtclass

The **query mgmtclass** command displays information about the management classes available in your active policy set.

Your administrator defines management classes that contain attributes controlling whether a file is eligible for backup or archive services. Management classes also determine how backups and archives are managed on the server.

Your active policy set contains a default management class; it can contain any number of additional management classes. You can assign specific management classes to files using ***include*** options that are located in the client options file `dsm.opt`. If you do not assign a management class to a file, Tivoli Storage Manager uses the default management class.

When you archive files, you can override the assigned management class by using the ***archmc*** option.

Syntax

Parameters

options
You can use the ***detail*** and ***fromnode*** command line options with the **query mgmtclass** command. For more information, see Chapter 10, "Using Options with Commands" on page 149.

Examples

Task Display default and available management classes.

Command: `dsmc query mgmtclass -det`

Query Restore

The **query restore** command displays a list of your restartable restore sessions in the server database. The list contains these fields: owner, replace, subdir, preservepath, source, and destination.

Certain restore operations, called restartable restore sessions, start a special protocol within Tivoli Storage Manager. Some restore sessions can be restarted for these reasons:

- Restartable restore sessions that fail because of network outage, client failure, server outage, or similar problem can be restarted from the point where they failed. Use the **restart restore** command to restart a restore session.
- Restartable restore sessions *lock* the file space so that files cannot be moved off sequential volumes. **query restore** displays the restartable restore sessions and their associated file space. Use the **cancel restore** command to cancel a restartable restore session.

Syntax

Parameters

options
For information about common options you can use with the **query restore** command, see Chapter 9, "Using Processing Options" on page 69.

Examples

Task Display your restartable restore session in the server database.

Command: `query restore`

Query Schedule

The **query schedule** command displays the events scheduled for your node. Your administrator can set up schedules to perform automatic backups and archives for you. To plan your work, use this command to determine when the next scheduled events occur.

Syntax

Parameters

options
You can use the ***dateformat*** common option with the **query schedule** command. See "Dateformat" on page 85 for more information.

Examples

Task Display your scheduled events.

Command: `dsmc query schedule`

Query Session

The **query session** command displays information about your session, including the current node name, when the session was established, server information, and server connection information.

Syntax

Parameters

options
For information about common options you can use with the **query session** command, see Chapter 9, "Using Processing Options" on page 69.

Examples

Task Display your session information.

Command: `dsmc query session`

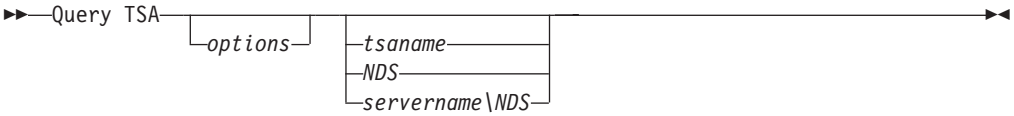
Query TSA

The **query tsa** command displays information associated with a specific NetWare Target Service Agent (TSA). This information includes the TSA name, type, version information, and location of the password file for the TSA (if applicable).

This command also verifies the user ID and password information, depending on how they are stored. If the user ID and password are stored locally using the ***nwpwfile*** option, and the current password file does not contain valid information, this command prompts for the correct information. This command also prompts for the correction information if a current password files does not exist. For more information, see "Nwpwfile" on page 109.

If the password is stored in the local options file ***nwuser***, the command verifies the user ID and password in that file. For more information, see "Nwuser" on page 110

Syntax



Parameters

options
You can specify the ***nwuser*** option with the **query tsa** command. This is helpful for generating a locally stored password in your `nwpwfile` options file when using the **query tsa** command in batch mode.

tsaname
Specifies the NetWare file server TSA name you want to query. Ifyou do not specify *tsaname* or *NDS*, the client uses the local NetWare file server name.

NDS
Specifies that you want to query the TSA (TSANDS.NLM) for the Novell Directory Services (NDS).

servername\NDS
Specifies that you want to query a remote TSA (TSANDS.NLM) for the Novell Directory Services (NDS) which is loaded on fileserver *servername*.

Examples

Task Query local file server TSA.

Command: `dsmc q tsa`

Task Query TSA for file server `ramke`.

Command: `dsmc q tsa ramke`

Task Query TSA for NDS.

Command: `dsmc q tsa nds`

Task Query TSA for NDS; `tsands.nlm` is loaded remotely on file server `mock`.

Command: `dsmc q tsa mock/nds`

Task Create .pwd file for file server ramke in batch mode.

Command: `dsmc q tsa ramke -nwuser=.admin.adsm:viksne -nwpwfile=yes`

Task Create .pwd file for file server ramke in interactive mode.

Command: `dsmc q tsa ramke -nwpwfile=yes`

Task Create .pwd file for NDS interactively.

Command: `dsmc q tsa nds -nwpwfile=yes`

Example 1

A sample output for **query tsa** follows:

```
Tivoli Storage Manager
Command Line Backup Client Interface - Version 3, Release 1
(C) Copyright IBM Corporation, 1990, 1999, All Rights Reserved.

Node Name: GOETHE
Session established with server spikes: Windows NT
  Server Version 3, Release 1, Level 0.1
  Server date/time: 16/04/1999 16:09:52
  Last access: 16/04/1999 16:08:39

Connecting to a NetWare File System (goethe)

Connected to goethe

TSA Name..........: goethe
TSA Module Name........: TSA410.NLM
TSA Version.....: 4.14.0
SMDR Version....: 1.0.0
User/Password Location..: goethe\sys:tsm/030199/74cc82cb.pwd
User/Password Valid.....: Yes

tsm>
```

Example 2

A sample output for **query tsa nds** (no password file present) follows:

```
Tivoli Storage Manager
Command Line Backup Client Interface - Version 3, Release 7
(C) Copyright IBM Corporation, 1990, 1999, All Rights Reserved.

Node Name: goethe
Session established with server spikes: Windows NT
  Server Version 3, Release 1, Level 0.1
  Server date/time: 06/04/1999 16:09:52
  Last access: 06/04/1999 16:08:39

Connecting to a Novell Directory (goethe_tree)

Please enter NetWare user for "goethe_tree":.admin.adsm

Please enter the password on "goethe_tree" for NetWare
user".admin.adsm":*****

Connected to goethe_tree

NetWare TSA Information

TSA Name..........: goethe
TSA Module Name........: tsands
TSA Version.....: 1.0.0
SMDR Version....: 1.0.0
```

```
User/Password Location..: goethe\sys:tsm/040199/5e82fd66.pwd
User/Password Valid.....: Yes

tsm>
```

Example 3

A sample output for **query tsa** (non-NetWare platforms) follows:

```
Tivoli Storage Manager
Command Line Backup Client Interface - Version 3, Release 7
(C) Copyright IBM Corporation, 1990, 1999, All Rights Reserved.

Node Name: spikes
Session established with server spikes: Windows NT
  Server Version 3, Release 1, Level 0.1
  Server date/time: 06/04/1999 16:09:52  Last access: 06/04/1999 16:08:39

Selected function is not supported for this client platform.

tsm>
```

Restart Restore

The **restart restore** command displays a list of your restartable restore sessions in the server database. You can select zero or more restartable restore sessions that you want to restart.

The restarted restore uses the same options you used in the failed restore. The restarted restore continues from the point at which the restore previously failed.

To cancel restartable restore sessions, use the **cancel restore** command. Use the **restart restore** command when:

- Restartable restore sessions lock the file space at the server so that files cannot be moved off the server's sequential volumes.
- You cannot back up files affected by the restartable restore.

Options from the failed session supersede new or changed options for the restarted session.

Syntax

Parameters

options

For information about common options you can use with the **restart restore** command, see Chapter 9, "Using Processing Options" on page 69.

Examples

Task Restart a restore.

Command: `restart restore`

This command is only valid in interactive mode.

Restore

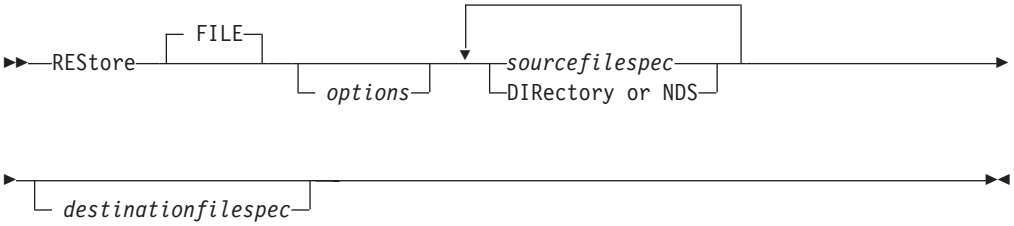
The **restore** command obtains copies of backup versions of your files from a server. To restore files, specify the directories or selected files, or select the files from a list. Restore files to the directory from which you backed them up or to a different directory. Tivoli Storage Manager uses the ***preservepath*** option with the *subtree* value as the default for restoring files. For more information, see "Preservepath" on page 174.

If you set the ***subdir*** option to *yes* when restoring a specific path and file, Tivoli Storage Manager recursively restores *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

System trustee rights are restored as part of the file restore process. They cannot be restored alone.

You can use the **restore** command to restore a backup set. See "Restore Backupset" on page 216 for the syntax.

Syntax



Parameters

file
This parameter specifies that the source file specification is an explicit filename. This parameter is required when you restore a file name from the current path, when you do not specify a relative or absolute path, and when the file name conflicts with one of the reserved **restore** command keywords, such as **restore *backupset***. See "Maximum File Size for Operations" on page 185 for the maximum file size for restore processing.

options
You can use these command line options with the **restore** command: ***dirsonly, filelist, filesonly, fromdate, fromnode, fromtime, ifnewer, inactive, latest, pick, pitdate, pittime, preservepath, todate, totime***. For more information, see Chapter 10, "Using Options with Commands" on page 149.

You can use these common options with the **restore** command: ***replace, subdir***. See Chapter 9, "Using Processing Options" on page 69 for information about common options.

sourcefilespec
Specifies the path and file name in storage that you want to restore. Use wildcard characters to specify a group of files or all the files in a directory.

DIRectory or NDS
Restores the NDS. To restore the entire directory, enter:

```
restore dir:* -sub=yes
```

To restore one container, enter:

```
dir:.o=container_name
```

In all examples, you may enter *nds:* instead of *dir:*.

Note: Objects added after the backup version was created are *not* deleted.

destinationfilespec
Specifies the path and file name where you want to place the retrieved files. The path and file name must follow DOS naming conventions. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path.

Examples

Task Restore a single file named `budget`.

Command: `dsmc restore sys:u/projecta/budget`

Task Restore all files with a file extension of `.bak` from the `sys:projecta` directory.

Command: `dsmc res sys:u/projecta/*.bak`

Task Restore files in the `sys:user/project` directory. Use the ***pick*** and ***inactive*** options to select active and inactive backup versions.

Command: `dsmc res servb\sys:user/project/* -pick -inactive`

Task Restore all files from the `sys:projecta` directory that end with `.bak` to the `sys:projectn` directory.

Attention: If the destination is a directory, specify the delimiter (/) as the last character of the destination. If you omit the delimiter and your specified source is a directory or a file spec with a wildcard, you will receive an error.

Command: `dsmc res sys:projecta/*.bak sys:projectn/`

Task Restore all files from the `sys:projecta` directory that end with `.bak` to another directory on a different NetWare server, `serverb\sys:projectn`. `Projectn` need not exist on `serverb`.

Command: `dsmc restore sys:projecta/*.bak serverb\sys:projectn/`

Task Restore the NDS.

Command: `dsmc res T9.dir:* -su=y -replace=y`

Task Restore the .o=ibm organization in the NDS.

Command: `dsmc res adsm40.directory.o=ibm`

Task Restore files in the `sys:user/project` directory. Use the ***pick*** option and the ***inactive*** option.

Command: `dsmc res servb\sys:user/projedct/* -pick -inactive`

Task Restore files specified in the filelist to a different location.

Command: `dsmc res sys:dir1/dir2/restorelist.txt sys:home/NewRestoreLocation/`

Restore Backupset

The **restore backupset** command restores a backup set from the server or from a local file.

If you are restoring a file space from a backup set to a system that did not perform the original backup, you may need to:
- Specify a destination
- Use the syntax below to specify the source file
- Do both of the above

If you are unable to restore a backup set from portable media, check with your Tivoli Storage Manager administrator to ensure that the portable media was created on a device using a compatible format.

Note: There is no support in the API for the backup set format. Therefore, backup set data that was backed up via the API cannot be restored or used.

NDS restores are not supported. If Tivoli Storage Manager creates a backup set containing only the NDS, and you attempt to restore it with the **restore backupset** command, an error message appears. If a backup set contains both a file specification and the NDS, no error message is produced, however only the file specification is restored. To restore the NDS, you must use the use the **restore** command from the command line.

The **restore backupset** command restores a backup set from the server or a local file only. For example, the following command restores a backup set from the server: `tsm> res backupset bkset.101394 -su=y -rep=all`, and the following command restores the backup set from `file` on a local NetWare server: `tsm> res backupset sys:\34477804.ost -su=y -rep=all -loc=file`.

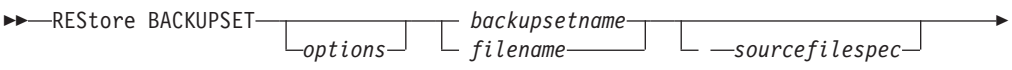
If you copy a backup set from the Tivoli Storage Manager server to the NetWare server in order to restore it, you must specify `–loc=file`. The backup set can reside on NetWare volumes, CDROM, DVD, or a similar device that can be mounted as a volume with files that can be accessed as file specifications.

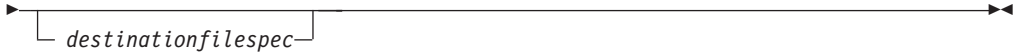
You cannot restore a subset of files from a local backup set. The following error message appears: *"Invalid source file specification."*

Attention: If the object you want to restore is part of a backup set generated on a node, and the node name is changed on the server, any backup set objects that were generated prior to the name change will not match the new node name. Ensure that the node name is the same as the node for which the backup set was generated.

You can restore backup sets in a storage area network (SAN) by specifying the ***location***=*server* option to restore the backup set directly from the server via the LAN.

Syntax





Parameters

options
You can use these command line options with the **restore backupset** command: ***location***, ***ifnewer***, ***preservepath***. See Chapter 10, "Using Options with Commands" on page 149 for information about these command line options.

You can use these common options with the **restore backupset** command: ***quiet, replace***, ***subdir***. See Chapter 9, "Using Processing Options" on page 69 for information about these common options.

backupsetname
Specifies the name of the backup set on the server from which to perform a restore operation. You cannot use wildcard characters to specify the backup set name. Tivoli Storage Manager restores the backup set from the server via LAN.

filename
Specifies the name of a local file from which to perform a restore operation.

sourcefilespec
Specifies the source path which can be a portion of the backup set. The default is to restore the entire backup set.

destinationfilespec
Specifies the destination path for the restored files. If you do not specify a *sourcefilespec*, you cannot specify a *destinationfilespec*. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path. If you are restoring more than one file, you must end the specification with a directory delimiter (/), otherwise, Tivoli Storage Manager assumes the last name is a file name and reports an error. If you are restoring a single file, you can optionally end the specification with a file name if you want to give the restored file a new name.

Examples

Task Restore a backup set called `mybackupsetname` from the server.

Command: `dsmc restore backupset mybackupsetname -loc=server`

Task Restore the backup set contained in the `backupsetfile.name` file in the `budget` directory.

Command: `dsmc restore backupset sys:u/budget/backupsetfile.name -location=file`

Retrieve

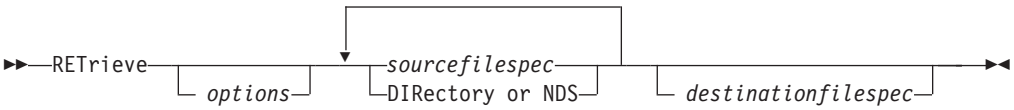
The **retrieve** command obtains copies of archived files from the Tivoli Storage Manager server. You can retrieve specific files or entire directories. Use the ***description*** option to specify the descriptions assigned to the files you want to retrieve.

You can also use the ***pick*** option to display a list of your archives. From this list, you can select an archive to retrieve.

Retrieve the files into the same directory from which they were archived, or in a different directory. Tivoli Storage Manager uses the *preservepath* option with the *subtree* value as the default for restoring files. For more information, see Chapter 10, "Using Options with Commands" on page 149.

Note: If you are retrieving files to a different directory than the original directory, file names become the names you specify with the *destinationfilespec* parameter. Because only DOS names are valid within the client, the file name becomes a DOS name.

Syntax



Parameters

options
You can use these command line options with the **retrieve** command: ***description, dirsonly, filelist, filesonly, fromdate, fromnode, fromtime, ifnewer, pick, pitdate, preservepath, todate, totime***. For more information, see Chapter 10, "Using Options with Commands" on page 149.

For information about common options you can use with the **retrieve** command, see Chapter 9, "Using Processing Options" on page 69.

sourcefilespec
Specifies the path and file name that you want to retrieve. Use wildcard characters to specify a group of files or all the files in a directory. See "Maximum File Size for Operations" on page 185 for the maximum file size for retrieve processing.

DIRectory or NDS
Retrieves the NDS.

destinationfilespec
Specifies the path and file name where you want to retrieve the files to. The path and file name must follow DOS naming conventions. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path.

Examples

Task Retrieve a single file named `budget`.

Command: `dsmc ret sys:projecta/budget`

Task Retrieve all files with an extension of `.bak` from the `sys:projecta` directory.

Command: `dsmc retrieve sys:projecta/*.bak`

Task Retrieve files in the `sys:project` directory. Use the ***pick*** option.

Command: `dsmc ret sys:project/* -pick`

Task Retrieve all files from the `sys:projecta` directory that end with the characters `.bak` to the `sys:projectn/` directory.

Command: `dsmc ret/projecta/*.bak servb\sys:projectn/`

Note: If the destination is a directory, you must specify the delimiter (/) as the last character of the destination. If you omit the delimiter and your specified source is a directory or a file spec with a wildcard, you will receive an error.

Task Retrieve all files in the `sys:home` directory.

Command: `dsmc retrieve sys:home/*`

Note: To retrieve files contained in a subdirectory, you must specify the subdirectory in another **retrieve** command.

Task Retrieve files in the `sys:project` directory. Use the ***pick*** option.

Command: `ret sys:project/* -pick`

Schedule

The **schedule** command starts the client scheduler on your workstation. The client scheduler must be running before scheduled work can start.

If the ***schedmode*** option is set to polling, when you start the client scheduler it continuously contacts the server for scheduled events based on the time you specified with the ***queryschedperiod*** option in your client options file `dsm.opt`. If your administrator sets the ***queryschedperiod*** option for all nodes, that setting overrides your setting.

If you are using TCP/IP communications, the server can prompt your workstation when it is time to run a scheduled event. To do so, set the ***schedmode*** option to *prompted* in the client options file `dsm.opt` or on the **schedule** command.

Note: Tivoli Storage Manager does not support the client scheduler running in *prompted* mode across a firewall. Use the client scheduler in *polling* mode across a firewall.

After you start the client scheduler, it continues to run and to start scheduled events. To end the scheduler, enter **QQ**. If the scheduler is active, it completes necessary transactions, then stops.

Syntax

Parameters

options
You can use these common options: ***maxcmdretries***, ***password***, ***queryschedperiod***, ***retryperiod***, ***schedlogname***, ***schedmode***, and ***tcpclientport***. See Chapter 9, "Using Processing Options" on page 69 for more information.

Examples

Task Start the client scheduler.

Command: `dsmc schedule –password=notell`

When you run the **schedule** command, all messages regarding scheduled work are sent to a file called `dsmsched.log` or to an alternate file you specify with the ***schedlogname*** option in your client options file `dsm.opt`. If you do not specify a directory path with the file name in the ***schedlogname*** option, the `dsmsched.log` file will reside in the default installation directory.

Selective

The **selective** command backs up files that you specify. If these files become damaged or lost, you can replace them with backup versions from the NetWare server. When you run a selective backup, all the files are candidates for back up unless they are excluded from backup in your include-exclude list, or they do not meet management class requirements for serialization.

You can selectively back up single files and directories from the NetWare server. You can also selectively back up the NDS. Use wildcard characters to back up groups of related files.

During a selective backup, copies of the files are sent to the server even if they did not change since the last backup. This might result in more than one copy of the same file on the server. If this occurs, you might not have as many different down-level versions of the file on the server as you intended. Your version limit might consist of identical files. To avoid this, use the **incremental** command to back up only new and changed files.

If back up of a file fails, determine if it is marked for execute only or if it is opened and locked by another user.

If you set the ***subdir*** option to *yes* when backing up a specific path and file, Tivoli Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

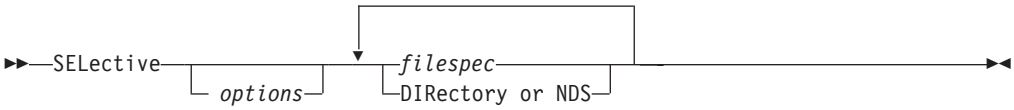
During a selective backup, a directory path may be backed up, even if the specific file that was targeted for backup is not found. For example:

```
dsmc selective sys:dir1/dir2/bogus.txt
```

still backs up dir1 and dir2 even if the file `bogus.txt` does not exist.

If the **selective** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Tivoli Storage Manager attempts to transfer during *all* command attempts. Therefore, the statistics for bytes transferred may not match the file statistics, such as those for file size.

Syntax



Parameters

options

You can use these command line options with the **selective** command: ***dirsonly, filesonly, volinformation, filelist***. For more information, see Chapter 10, “Using Options with Commands” on page 149.

You can use these common options with the **selective** command: ***changingretries, quiet, tapeprompt, subdir***. See Chapter 9, “Using Processing Options” on page 69 for information about these common options.

filespec
Specifies the path and file name that you want to back up. Use wildcard characters to select a group of files or all the files in a directory. You can enter up to 20 file specifications in a command, separating the file specifications with a space.

DIRectory or NDS
Specifies that you want to back up the NDS. To back up the entire directory, specify `dir:.* -su=y`. To back up one container in the directory, specify `dir:.o=nds_object`. An NDS object can contain container objects and leaf objects. In all examples, you may enter `nds:` instead of `dir:`.

Examples

Task Back up the `proja` file in the `sys:u/devel` directory.

Command: `dsmc selective sys:u/devel/proja`

Task Back up all files in the `sys:u/devel` directory whose file names begin with `proj`.

Command: `dsmc selective sys:u/devel/proj*`

Task Back up all files in the `sys:u/devel` directory whose file names begin with `proj`. Back up the single file named `budget` in the `sys:user` directory.

Command: `dsmc selective sys:u/devel/proj* sys:user/budget`

Task Back up the entire NDS.

Command: `dsmc s t9\dir:.* -su=y`

Task Back up the tfr organization container of the NDS.

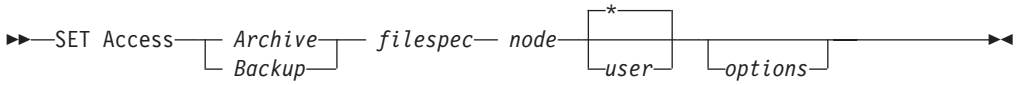
Command: `dsmc t9\dir:.o=tfr.* -su=y`

Set Access

The **set access** command gives users at other nodes access to your backup versions or archived copies. You can give another user access to a specific file, multiple files, or all files in a directory. When you give access to another user, that user can restore or retrieve your objects. Specify in the command whether you are giving access to archives or backups.

Note: You cannot give access to both archives and backups using a single command. Access is enabled only between like platforms. You can grant access only to another NetWare client node.

Syntax



Parameters

Archive
Permits access to archived files.

Backup
Permits access to backup versions of files.

filespec
Specifies the path, file or directory to which you are giving access to another node or user. Use wildcard characters to specify a group of files, or all files in a directory; all objects in a directory branch; or all objects in a volume. Use a single asterisk ″*″ for the file spec to give access to all files owned by you and backed up on the server. When the command **set access backup** ″*″ **node user** is entered, no check is made with the server; it is assumed you have at least one object backed up.

If you give access to a branch of the current working directory, you only need to specify the branch. If you give access to objects that are not in a branch of the current working directory, you must specify the complete path. The file spec to which you gave access must have at least one backup version or archive copy object (file or directory) on the server.

To give access to all objects below a certain level, use an asterisk, directory delimiter, and an asterisk at the end of your file spec. For example, to give access to all objects below `sys:ann`, use file spec `sys:ann/*/*`.

To specify all files in all directories off the root directory, enter **sys:*/*** on the command line. Enter `sys:*` on one **set access** command and `sys:*/*` on another if you want another user to have complete access to your file space. The first `sys:*` gives access to all subdirectories and all files off the root directory.

node
Specifies the client node of the user to whom you are giving access. Use wildcards to give access to more than one node with similar node names. Use an asterisk (*) to give access to all nodes.

A node name that begins with a (/) or a (-) character must be contained within single (') or double (") quotes. If the *node* parameter is specified when the **set access** command is run in batch mode, the node name must be contained within *both* sets of quotes. For example:

```
dsmc set access backup sys:\*\* "'-testnode'"
```

user
Specifies the name of the user to whom you are giving access. Use a single asterisk or omit this parameter to give access to all users at the specified node.

options
See Chapter 9, "Using Processing Options" on page 69 for information about common options that you can use with this command.

Examples

Task Give the user at `node_2` authority to restore the `budget` file from the `sys:user` directory.

Command: `dsmc set access backup sys:budget node_2`

Task Give `node_3` authority to retrieve all files in the `sys:devel/proja` directory whose file names end with `.sys`.

Command: `dsmc set access archive sys:devel/proja/*.sys node_3`

Task Give `node_3` the authority to retrieve all files in the `sys:u/devel/proja` directory.

Command: `dsmc set a archive sys:u/devel/proja node_3`

Task Give all nodes whose names end with `bldgb` the authority to restore all of your backed up files.

Command: `dsmc set a b *bldgb`

Task Give `node3` authority to restore all your backed up files.

Command: `dsmc set access b * node3`

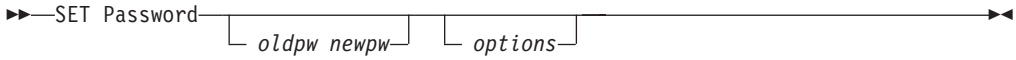
Set Password

The **set password** command changes the Tivoli Storage Manager password for your workstation. If you omit the old and new passwords when you enter the **set password** command, you are prompted once for the old password and twice for the new password.

A password is *not* case-sensitive, and it can be as many as 63 characters. Valid characters are:

a–z Any letter, a through z, upper or lower-case
0–9 Any number, 0 through 9
+ Plus
. Period
_ Underscore
- Hyphen
& Ampersand

Syntax



Parameters

oldpw
Specifies the current password for your workstation.

newpw
Specifies the new password for your workstation.

options
Select any valid common option. For more information, see Chapter 9, "Using Processing Options" on page 69.

Examples

The following is an example of using the **set password** command.

Task Change your password from `osecret` to `nsecret`.

Command: `dsmc set password osecret nsecret`

Tivoli Storage Manager NetWare Backup and Recovery Guide

This chapter discusses the basic structure of the NDS (Novell Directory Services), and provides recovery scenarios to protect NDS data against loss or corruption.

The NDS is an object-oriented, hierarchical database that manages resources such as servers, users, groups, file systems, and printers in a network. The NDS is a global service that physically resides on multiple servers within a network. Please refer to the publication, Novell NetWare *Introduction to Novell Directory Services*, for general information about the NDS. This publication should be included in the NetWare installation package.

NDS Backup Considerations

Storage Management Services

Tivoli Storage Manager uses Novell's Storage Management Services (SMS) as the interface to the NetWare operating system. This section discusses the pertinent components of the SMS architecture.

Note that any limitations existing in the SMS architecture imply a limitation of Tivoli Storage Manager.

Target Service Agent (TSA)

A *target* in the context of SMS is an entity on the network that requires back up. To Tivoli Storage Manager, these targets are NetWare servers and NDS trees.

The TSA presents data in a system independent data format known as SIDF (system independent data format).

To back up the NDS, the target service agent TSANDS.NLM must be loaded on one of the NetWare servers in the network. Typically, TSANDS.NLM is loaded on the same server on which DSMC.NLM is loaded, but these modules can be loaded on separate servers. See "Specifying the Entire NDS for Backup" on page 228 for more discussion.

The target service agent for NetWare 5.1 servers is TSA500.NLM. Use for TSA600.NLM for NetWare 6.1 servers.

Storage Management Data Requester (SMDR)

SMDR is the communication agent between the backup application and the target service agent. You must load the SMDR.NLM module to perform a backup or restore of the NDS. Tivoli Storage Manager automatically loads the SMDR.NLM module.

SMS Currency

It is important to use the most current SMS modules available from Novell to avoid problems such as memory leaks or server crashes. The Tivoli Storage Manager NetWare client does not include these SMS modules.You can obtain current copies of the TSA500.NLM or TSA600.NLM, TSANDS.NLM, and SMDR.NLM modules through Novell. For current information about Novell NLM, OS currency, and SMS code levels, visit:

`http://www.novell.com`

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For current information about Tivoli Storage Manager client currency, visit:

```
http://www.tivoli.com
```

on the Web or our FTP server at

```
ftp.software.ibm.com
```

Tivoli Storage Manager and NDS

This section describes the nuances used in the Tivoli Storage Manager client when dealing with NDS trees.

Naming Conventions for NDS Objects

Tivoli Storage Manager Version 4 and above store NDS object names as the typeful, distinguished object name including '.[Root]'.

For example, the object *CN=Spike.OU=Development.O=TSM* backed up from server **GOETHE** would have the following Tivoli Storage Manager name:

```
.[Root].CN=SPIKE.OU=DEVELOPMENT.O=TSM
```

Note: Tivoli Storage Manager stores all NDS names on the server in upper case to allow mixed-case searches. Tivoli Storage Manager preserves the case of NDS objects during a restore or retrieve operation.

NDS Backup Using Tivoli Storage Manager

Tivoli Storage Manager Version 5.1 and above use a file space name of **NDS** when backing up the NDS. As a result, please consider the following:

- You *cannot* backup or archive a NetWare volume named **NDS:**. We recommend that you do not use **NDS** as a NetWare volume name.
- When using the Tivoli Storage Manager for the first time, you should back up the NDS.
- If you need to restore a version of the NDS that was backed up by a Tivoli Storage Manager Version 3 client, you must use the Tivoli Storage Manager client version used to back up the NDS.

Specifying the Entire NDS for Backup

Any server on which the TSANDS.NLM module is loaded can back up the NDS. The module TSANDS.NLM is not server centric. You can load this module on any server containing an NDS partition. If the module TSANDS.NLM is loaded on a different server than DSMC.NLM, the former server must be explicitly specified. For example, if you load TSANDS.NLM on server **GOETHE**, you can load DSMC.NLM on a different server and backup the NDS using the following command:

```
load dsmc incremental goethe/directory
```

Note: The NDS is not included in all-local domain; you must explicitly code **NDS** in the ***domain*** option or use one of the following backup commands to back up the NDS:

- To back up the entire NDS, enter the following:

  ```
  load dsmc selective nds:* -subdir=yes -volinfo
  ```
- To archive the entire NDS, enter the following:

  ```
  load dsmc archive nds:* -subdir=yes -volinfo
  ```
- To perform an incremental backup of the entire NDS, enter the following:

```
load dsmc incremental nds   - or -
load dsmc incremental nds:
```

The ***incremental*** command will always process the *.[Root]* and *Schema* objects.

Specifying NDS Objects for Backup, Restore and Queries

The following examples show how to specify NDS objects for backup, archive, restore, retrieve, and query operations:

- Specifying entire NDS tree:

  ```
  selective nds:* -subdir=yes
  ```
- Specifying all objects in a container (e.g., organizational unit)

  ```
  restore nds:.o=tsm.* -subdir=no
  ```
- Specifying all objects in a container and all sub-containers

  ```
  retrieve nds:.o=tsm.* -subdir=yes
  ```
- Specifying all objects containing the string *spike* in the object name

  ```
  query backup nds:*spike* -subdir=yes
  ```
- Specifying the root object, Schema, and high-level organization

  ```
  archive nds:* -volinfo -subdir=no
  ```

Note: The following commands are not case sensitive and will produce the same results:

```
query backup nds:.O=TSM.*
query backup nds:.o=Tsm.*
```

Include-Exclude Processing

You can use ***include*** and ***exclude*** statements to control which sections of the NDS tree are eligible for backup processing. You can use include-exclude processing to help distribute the NDS backup over multiple servers.

The following are examples of excluding NDS objects:

- To exclude all objects under organization .O=TSM (inclusive):

  ```
  exclude.dir nds:.o=tsm
  ```
- To exclude all common (leaf) objects under organizational unit .O=TSM. All containers (i.e., organizations) under .O=TSM will be processed.

  ```
  exclude nds:.o=tsm.*
  ```
- To exclude all objects under organizational unit .O=TSM.San Jose (inclusive). If the organizational unit name contains spaces, enclose the target in quotes.

  ```
  exclude.dir "nds:.o=tsm.ou=San Jose"
  ```
- To exclude all leaf-objects named *RAMKE*:

  ```
  exclude nds:*.cn=ramke
  ```

Note: Include-exclude processing does not affect processing of container entries. As with directories, all containers will be backed up regardless of the include-exclude statements you use. Tivoli Storage Manager client Versions 4 and above accept the ***exclude.dir*** option which also exclude directory entries.

Note: You cannot use the ***include*** and ***exclude.dir*** options together. The following example will not produce desired results:

```
exclude.dir nds:.O=TSM
include nds:.O=TSM.OU=Tucson.*
```

You must use the following statements to include only the objects in the *.O=TSM.OU=Tucson* branch of the NDS:

```
exclude nds:.O=TSM.*
include nds:.O=TSM.OU=Tucson.*
```

User Rights Required to Backup or Restore NDS

SMS currently requires that you possess supervisory object rights to the highest level of container during a backup or restore operation. For the entire NDS tree, this implies that you possess supervisory object rights to **[Root]**.

Conventions for Logging into a NetWare Server

When logging into a NetWare server from Tivoli Storage Manager, you must use one of the following:

- A typeful, full distinguished name
- A typeless, full distinguished name
- A bindery-emulation name used in proper context.

For example, if you receive the following message:

```
Please enter NetWare user for "ELLAS":
```

You can specify one of the following:

- The typeful, full distinguished name

  ```
  .CN=Admin.O=TSM
  ```

- The typeless, full distinguished name

  ```
  .Admin.TSM
  ```

- The bindery-emulation name used in proper context.

  ```
  Admin (if the Context is set to .O=TSM)
  ```

Note: You do not need to specify the context. The context does not affect Tivoli Storage Manager NDS processing.

The Tivoli Storage Manager login to the NetWare server follows the same protocol as other logins to the NetWare server. NetWare will not allow Tivoli Storage Manager to login to the NetWare server under the following conditions:

- The user-id you specify has a login restriction based on time-of-day.
- The user-id you specify has a login restriction based on number of concurrent connections.
- NetWare is not allowing logins (DISABLE LOGIN was issued at the console).
- The password is incorrect or has expired.

Schema Backup or Restore

The client will backup or archive the NDS Schema (including the *extended schema*) during an incremental backup of the NDS or explicitly with the ***volinformation*** option. For example, you can use the following commands to backup or archive of the Schema:

```
load dsmc incremental nds
load dsmc selective nds:* -subdir=no -volinfo (explicit)
load dsmc archive nds:* -subdir=no -volinfo (explicit)
```

You can restore or retrieve the Schema information when performing a full or explicit NDS restore. The Schema object will always be the first object restored or retrieved. The ***volinformation*** option is not necessary for restore or retrieve:

```
load dsmc restore nds:* -subdir=yes -replace=all
load dsmc retrieve nds:* -subdir=yes -replace=all
```

You can explicitely restore or retrieve the NDS Root, Schema, and top-level Organization as follows (note that there is no file specification):

```
load dsmc restore nds: -subdir=no
```

Server Specific Information

When a server is lost due to a hard disk failure or disaster, the server object can be replaced by Tivoli Storage Manager backup data during the NetWare installation process by restoring the *server specific information* resource via Tivoli Storage Manager.

Ensure that the server specific information is being backed-up on regular basis. The server specific information will be backed up on NetWare 5.1 and 6.1 servers as part of the incremental backup process if you specify the *all-local* domain in the client options file *dsm.opt*. If you specify the *all-local* domain, the incremental process always backs up server specific information first, before the `SYS:` volume. You can also explicitly specify server specific information in the *domain* statement, as follows:

```
domain all-local (implicit)
domain serverspecificinfo (explicit)
```

You can also selectively backup the server specific information as follows:

```
load dsmc selective serverspecificinfo
```

You can verify that the server specific information is backed up by querying the node's file spaces from the admin or backup client. There should be a file space called ***servername*\SERVERSPECIFICINFO** associated with the node.

To restore a server which has failed with server specific information available:

1. After the server failure, restore the server specific information to another server so that it can be used during the server installation process. For example, you have two NetWare servers, *SERVER-A* and *SERVER-B*. *SERVER-A* experiences a failure and must be restored. Restore the server specific information of *SERVER-A* onto *SERVER-B* by issuing the following command from *SERVER-B*:

   ```
   load dsmc restore server-a/serverspecifcinfo server-b/serverspecificinfo -replace=yes
   ```

   The server specific information for *SERVER-A* is restored to the following location:

   ```
   server-b/sys:\system\server-a
   ```

   Note: If the NetWare server name you are restoring is more than eight characters, the directory name created during the server specific information restore is truncated to eight characters.

   Tivoli Storage Manager restores the following files during the server specific information restore:

   SERVDATA.NDS
   Contains the information needed by the NetWare installation procedure to restore the server object to its original state.

   DSMISC.LOG
   A text file containing various NDS information, including the server's replica list.

   VOLSINFO.TXT
   A text file which contains the full server name (i.e., if the directory name had been truncated), a list of volumes present on the server at the time of the last server specific information backup, the name spaces

and extend file formats (e.g., compression) enabled on the volumes. This file is meant to aid the user during server recovery.

AUTOEXEC.NCF
The server's *autoexec.ncf* file.

STARTUP.NCF
The server's *startup.ncf* file.

2. Reinstall the NetWare operating system on the failed server. You *must* specify the same *FILE SERVER NAME* and the same *IPX INTERNAL NET* number if you wish to recover the server object properly. You can find this information in the failed server's *autoexec.ncf* file, which is restored with the server specific information (see point above). Follow the NetWare installation instructions until you are prompted to install NDS.
3. Restore the NDS server object from the backup copy. When prompted for the directory tree in which you want to install the server, follow these steps:
   - Press *F5* to Restore NDS.
   - Press *F3* to specify the path to restore the DS backup file, SERVDATA.NDS.
   - Specify the path where the server specific information was restored. In the previous example, the path is:

     ```
     server-b/sys:\system\server-a
     ```

After restoring the server object back into the NDS, you can proceed to restore the rest of the operating system from backup; you will not need to copy the rest of the files normally copied during the install process. Please refer to "NDS Restore Considerations" on page 235 for more information about restoring the NetWare servers and NDS in their entireties.

NDS Specific Backup Issues

Before realizing an NDS recovery solution, it is necessary to understand NDS concepts as they relate to the backup procedure. This section introduces NDS concepts in the context of the backup procedure.

Partitions

Partition boundary information is not backed up by SMS. We recommend that you make a blueprint of the NDS tree structure to accommodate the recovery after the loss of the entire NDS tree. When restored, you can use utilities like NWADMIN or PARTMGR to reset the partition boundaries within the tree.

Replicas

Partition replication is the best mechanism to protect NDS information against loss in a multi-server environment. We recommend that you replicate each partition at least three times. If possible, do not store all replicas in the same location, in case a disaster devastates the entire location. Replica assignments (i.e. Master, Read/Write, Read/Only, Subordinate) are not backed up by SMS. This information should be part of your NDS tree blueprint and can be reset using NetWare utilities.

Schema

The schema is the set of rules which governs the properties of the NDS (structural relationships, object properties, etc). The schema is global and is replicated on each server that contains an NDS replica.

OEM products can extend the schema to create new object classes. These extensions are globally copied to each server that contains an NDS replica. Therefore, in a multi-server environment, the loss of a single server would not effect the schema extensions.

In the case of a loss of the entire NDS (e.g., a single-server environment), the base schema is available when the initial NDS is created by the NetWare install procedure.

See "Schema Backup or Restore" on page 230 for complete information about backing up and restoring the schema.

Object References

Some NDS objects have attributes which are references to other objects. These object references are stored as full distinguished names. An example is an alias, which can reference a User or Group object.

During the restore of an object, the object being restored may reference an object that does not currently exist. In this case, a *place-holder* object is created to satisfy the object reference. These place-holders are eventually replaced by the real objects in the restore process.

During partial restores of the NDS, it is possible that the place-holder object is not specified for restore. In this case, the place-holder object will remain in the tree, appearing as an object of type *unknown*. These unknown objects can be handled by either deleting the unknown object or selectively restoring the real object.

Tivoli Storage Manager also treats place-holders as existing objects. As a result, we recommend that you specify the ***-replace=yes*** option during all NDS restorations, even if you are restoring the NDS from scratch.

In general, be careful with partial restores of the NDS. The current SMS architecture may not be robust enough to provide a partial restore, depending on the number and extent of object references in the NDS tree. The *unknown"* objects are created and left in the tree if referenced objects are not selected for the restore, or if you specify the ***-replace=no*** option during the restore.

Server Centric IDs

Server centric ids are unique ids assigned to each server. You can back up server centric ids on a NetWare operating system as part of the *server specific information* resource using the Tivoli Storage Manager client. See "Server Specific Information" on page 231 for more information about backup and restore processing for this resource.

If you do not have a backup of the server specific information, or do not have the ability to backup this information, please read the following information:

When servers are lost due to hard disk failures or disasters, Server objects must be manually deleted because NetWare currently requires that new Server objects be created during the installation process (see following recovery scenarios for examples). When the old Server object is deleted, any objects which have references to the Server object will lose their references. Therefore, objects that reference Server objects will have to be handled accordingly.

Currently, there are two object types in the base schema which have references to server objects:
- Directory Map Objects
- Queue Objects

If the Server object is lost, you can perform either of the following steps to recover these object types:
- Delete the referencing object and then restore the object from Tivoli Storage Manager
- Delete the referencing object and recreate the object manually using the NetWare utilities.

Because of the dependency on the server centric id, you cannot restore these objects types over existing objects.

Server References

Other objects, such as User objects, have optional attributes such as Home Directory and Default Server which reference Server objects. When you delete the Server object, these references are also deleted.

Restoring objects with server references is much like restoring files with trustee assignments. First, the Server object must be recreated, then the objects which have references to the server must be restored to correctly restore the server references.

Current Backup Limitations

To summarize, the following is a list of the current NDS backup limitations inherent in the SMS architecture:
- Partition or replica boundaries are not backed up.
- Partial restores are not practical due to object references.

Novell is aware of these limitations and is working to provide solutions in the future.

Backup Recommendations

- Backup the entire NDS tree periodically. Ensure that the *DIRECTORY* is included in the domain of at least one of your nightly, scheduled backups. Use include-exclude processing to potentially divide larger NDS tree backups over several servers.
- Exploit partition replication. Replicate each partition at least three times, potentially having replicas in different physical locations.
- Keep a blueprint of the NDS tree. Partition boundary information, replica assignments and schema extensions are not currently protected by the backup process. Keep an accurate blueprint of the NDS tree so that this information is available after a disaster.

Testing Considerations

We recommend that you rigorously test your backup plan before introducing it into a production environment. This section introduces some considerations during the testing phase.

Realistic Test Scenarios

To adequately test restoration of the NDS tree, you must create an autonomous NDS tree. It is not adequate to simply restore a tree to another server, as the target

server is probably part of the same NDS tree as the source server. If you want to merge or reorganize your NDS tree, there are better tools available from Novell to achieve this. The goal should be testing the recovery mechanism for loss of the entire NDS tree. To do this properly, an autonomous NDS tree must be created.

Synchronization Awareness

The NDS relies on a synchronization process to ensure that all replicas hold identical information. After changes are made to the NDS, the synchronization may not be immediate. This may affect testing in some instances.

For example, there may be a situation where you are testing the restore of a single object. You delete the object from a replica and then restore it using Tivoli Storage Manager. The object still appears to exist to Tivoli Storage Manager, because the replicas have not synchronized.

Synchronization should not play a major part of your testing, but be aware of its existence and its ramifications.

Testing Verification

You can verify the NDS tree after a restore operation by running a *DSREPAIR* operation against the NDS (either an unattended full repair or local DS repair). This operation will produce a log reporting any inconsistencies found in the NDS.

Trustee assignments to files and directories can be *spot checked* after a restore operation to verify their validity.

NDS Restore Considerations

This section outlines recovery procedures for the following scenarios:

- Loss of a non-SYS volume
- Loss of SYS volume (or entire server)
- Loss of entire NDS

Example 1: Loss of a Non-SYS Volume

NDS information is stored only on the SYS volume. Therefore, if you experience a hard disk failure on a non-SYS volume, you do not have to modify or restore any part of the NDS tree. You only need to restore file system data (including file and trustee data).

To restore a non-SYS volume after a hard disk failure:

1. Do not delete the Volume object for the failed volume from the NDS tree. In this situation, you can leave the Volume object in the NDS tree to preserve any references that other objects may have to the failed volume. If the Volume object is deleted, you will need to replace any objects that have references to the failed volume to reestablish the references correctly.
2. Bring down the server and replace the failed hard disk(s).
3. Bring the server up and recreate the volume using the NWCONFIG.NLM utility. At the server console, type

   ```
   load nwconfig
   ```

   and create a NetWare partition on the new disk, thus redefining the volume to NetWare. NetWare will (re)place the Volume object in the NDS tree.

Note: Ensure that utilities such as DSREPAIR.NLM or DSMAINT.NLM are not running when you load NWCONFIG.NLM to ensure that the Volume object is (re)placed in the NDS properly.

4. Remount the volume using NWCONFIG.NLM.
5. Load the necessary SMS target service agents. At the target NetWare server console type:

```
load tsands
load tsa500 (NetWare 5)  or
load tsa600 (NetWare 6)
```

6. Restore the volume(s) using Tivoli Storage Manager. Enter the following NetWare console command for each volume you want to restore:

```
load dsmc restore vol1:\* -subdir=yes -replace=all -volinfo
```

Where `vol1:` is the name of the failed volume.

Example 2: Loss of a SYS Volume or Entire Server

Since NDS information is stored on the SYS volume, the loss of the SYS volume may require the restoration of all or part of the NDS (depending on the availability of replicas) in addition to the file system data (including trustee rights).

Three different examples are presented:
- Single-server network
- Multiple-server network (replica present)
- Multiple-server network (replica not present)

Note that in all cases, the NetWare OS and the NDS must be reinstalled to the server before proceeding.

Example 2a: Single-Server Network

In a single-server network, the loss of the SYS volume implies the loss of the entire NDS. To restore the server, perform the following steps:

1. Replace the failed hard disk(s).
2. Reinstall the NetWare OS and NDS on the server. This step replaces the Server and Volume object(s). Using the NWCONFIG.NLM utility on NetWare, note the following precautions:
   - Use the same server name in the install.
   - Use the same admin parent container and password as the last NDS backup.
   - Ensure all hard disk partitions are at least as large as they were on the failed server.
   - Use the same volume names as on the failed server.

   This step replaces the Server and Volume object(s).
3. Ensure that the NetWare OS has the correct patches for Tivoli Storage Manager to function properly. Refer to the client*readme.1st* file for more information about dependencies on NetWare OS patches.
4. If the server had volumes other then SYS, and these volumes were not affected by the failure, run *DSREPAIR* to purge the file system of invalid trustees on those volumes. This step cleans-up the volume directory entry tables (DET) and file entry tables (FET) so that the trustee assignments can be restored correctly. At the server console, *LOAD DSREPAIR* and choose the **Unattended Full Repair** option. (This automatically purges invalid trustee assignments).
5. Install Tivoli Storage Manager and reestablish the communications protocol. Use the NWCONFIG.NLM utility to reinstall the Tivoli Storage Manager code

on the NetWare server. Reconfigure the communications protocol so that the Tivoli Storage Manager client can communicate with the Tivoli Storage Manager server.

6. Load the necessary SMS target service agents. At the target NetWare server console type:

```
load tsands
load tsa500 (NetWare 5)  or
load tsa600 (NetWare 6)
```

7. Restore the entire NDS tree from Tivoli Storage Manager.

   Use the following command at the NetWare server console:

```
load dsmc restore directory -replace=yes
```

   The ***-replace=yes*** option is required to ensure that place-holders created by the restore process are properly replaced by real NDS objects.

8. Restore the volume(s) using Tivoli Storage Manager. Use the following NetWare console command for each volume you want to restore:

```
load dsmc restore sys:\* -subdir=yes -replace=all -volinfo
```

   Where `sys:` is the name of the failed volume.

9. Verify restoration of the NDS, file data and trustee data.

Example 2b: Multiple-Server Network (replica present)

You can use this example in a situation in which the `SYS` volume (or entire server) is lost but replicas of all partitions which were present on the failed server exist on other servers. You can also use this example when a failed `SYS` volume (or entire server) contains no NDS replications.

In this example, you must restore NDS objects which referenced the failed Server object and failed Volume object(s), as well as the volume data (including trustee data). Perform the following steps to ensure recovery:

1. If the failed server contains any Master partitions, reassign the master to another server using the *DSREPAIR* utility.
2. Replace the failed hard disk(s).
3. Reinstall the NetWare OS and NDS on the server. If a backup copy of the server specific information is available, install the NetWare OS. See "Server Specific Information" on page 231 for more information. If a backup copy of the server specific information is not available, use the NWCONFIG.NLM utility on NetWare, with the following precautions:
   - Use the same server name in the install
   - Use the same admin parent container and password as the last NDS backup.
   - Ensure all hard disk partitions are at least as large as they were on the failed server.
   - Use the same volume names as on the failed server.
4. Ensure that the NetWare OS has the correct patches for Tivoli Storage Manager to function properly. Refer to the client `readme.1st` file shipped with the Tivoli Storage Manager client for more information about dependencies on NetWare OS patches.
5. If the server had volumes other then SYS, and these volumes were not affected by the failure, run DSREPAIR to purge the file system of invalid trustees on those volumes. This step cleans-up the volume DETs and FETs so that the trustee assignments can be restored correctly. At the server console,

LOAD DSREPAIR and choose the **Unattended Full Repair** option. (This automatically purges invalid trustee assignments).

6. Install Tivoli Storage Manager and reestablish the communications protocol. Use the NWCONFIG.NLM utility to reinstall the Tivoli Storage Manager code on the NetWare server. Reconfigure the communications protocol so that the Tivoli Storage Manager client can communicate with the Tivoli Storage Manager server.
7. Load the necessary SMS target service agents. At the target NetWare server console enter:

   ```
   load tsands
   load tsa500 (NetWare 5)  or
   load tsa600 (NetWare 6)
   ```

8. The following steps are necessary if the server specific information was not restored from a backup:
   a. Delete any objects which had server specific references. See "Server Centric IDs" on page 233 for more information about objects which reference the server object.
   b. Replace the objects which contained references to the failed Server and Volume objects. You can do this by restoring the entire NDS using the following command at the NetWare console:

      ```
      load dsmc restore directory -replace=yes
      ```

      The ***-replace=yes*** option ensures that place-holders created by the restore process are properly replaced by real NDS objects. If you are not comfortable with replacing the entire NDS, you can selectively restore each object or manually recreate the objects with NWADMIN or NETADMIN.
9. Restore the volume(s) using Tivoli Storage Manager. Use the following NetWare console command for each volume you want to restore:

   ```
   load dsmc restore sys:\* -subdir=yes -replace=all -volinfo
   ```

   Where `SYS:` is the name of the failed volume.
10. Verify restoration of the NDS, file data, and trustee data.

Example 2c Multiple-Server Network (Replica not present)

This example can be used in a situation in which the SYS volume (or entire server) is lost and partitions contained on the server were not replicated. In this example, you must restore any partitions that were not replicated, NDS objects which referenced the failed Server object and failed Volume object(s), and the volume data (including trustee data). The following steps are necessary for recovery:

1. If the failed server contains any Master partitions which was replicated, reassign the master to another server using the DSREPAIR utility.
2. Replace the failed hard disk(s).
3. Reinstall the NetWare OS and NDS on the server. If a backup copy of the server specific information is available, install the NetWare OS. See "Server Specific Information" on page 231 for more information. If a backup copy of the server specific information is not available, use the NWCONFIG.NLM utility on NetWare, with the following precautions:
   - Use the same server name in the install
   - Use the same admin parent container and password as the last NDS backup.
   - Ensure all hard disk partitions are at least as large as they were on the failed server.
   - Use the same volume names as on the failed server.

4. Ensure that the NetWare OS has the correct patches for Tivoli Storage Manager to function properly. Refer to the client `readme.1st` file shipped with the Tivoli Storage Manager client for more information about dependencies on NetWare OS patches.
5. If the server had volumes other then SYS, and these volumes were not affected by the failure, run DSREPAIR to purge the file system of invalid trustees on those volumes. This step cleans-up the volume DETs and FETs so that the trustee assignments can be restored correctly. At the server console, LOAD DSREPAIR and choose the **Unattended Full Repair** option. (This automatically purges invalid trustee assignments).
6. Install Tivoli Storage Manager and reestablish the communications protocol. Use the NWCONFIG.NLM utility to reinstall the Tivoli Storage Manager code on the NetWare server. Reconfigure the communications protocol so that the Tivoli Storage Manager client can communicate with the Tivoli Storage Manager server.
7. Load the necessary SMS target service agents. At the target NetWare server console enter:

   ```
   load tsands
   load tsa500 (NetWare 5)  or
   load tsa600 (NetWare 6)
   ```
8. Delete any objects which had server specific references. See "Server Centric IDs" on page 233 for more information about objects which reference the server object.
9. Restore the replicas. You can do this by issuing a restore at the replica root. For example, if the replica root was:

   ```
   OU=Islands.O=Greece
   ```

   you must issue the command:

   ```
   load dsmc restore nds:/.o=greece/.ou=islands.o=greece -replace=yes
   ```

   Since this is a partial restore, you may decide to restore the entire NDS by entering the following command at the NetWare console:

   ```
   load dsmc restore nds -replace=yes
   ```

   This eliminates the need for the next step while ensuring a consistent restore of the NDS tree. See "Object References" on page 233 for more details about partial restore limitations.
10. Replace the objects which contained references to the failed Server and Volume objects. You can do this by restoring the entire NDS using the following command at the NetWare console:

    ```
    load dsmc restore nds -replace=yes
    ```

    The ***-replace=yes*** option ensures that place-holders created by the restore process are properly replaced by real NDS objects. If you are not comfortable with replacing the entire NDS, you can selectively restore each object or manually recreate the objects with NWADMIN or NETADMIN.
11. Restore the volume(s) using Tivoli Storage Manager. Use the following NetWare console command for each volume you want to restore:

    ```
    load dsmc restore sys:\* -subdir=yes -replace=all -volinfo
    ```

    Where `SYS:` is the name of the failed volume.
12. Verify restoration of the NDS, file data, and trustee data.

Example 3: Loss of an Entire NDS Tree

In a situation in which all network servers are destroyed because of a disaster, you must restore the entire NDS tree and all file information. To do this, perform the following steps:

1. Reinstall the NetWare OS and NDS on a primary server. Use the NWCONFIG.NLM utility for this step. By default, this server will hold the Root partition of the NDS tree.
2. Install the remaining servers into the network using the NWCONFIG.NLM utility. After this step, you should have a *skeleton* of your original NDS. Ensure that you note the following precautions:
   - Use the same servers name in the install.
   - Use the same admin parent container and password as the last NDS backup.
   - Ensure all hard disk partitions are at least as large as they were on the failed server.
   - Use the same volume names as on the failed servers.
   - Place the servers in the same context as the original tree.
3. Ensure that the NetWare OS has the correct patches for Tivoli Storage Manager to function properly. Refer to the client `readme.1st` file shipped with the Tivoli Storage Manager client for more information about dependencies on NetWare OS patches.
4. Install Tivoli Storage Manager and reestablish the communications protocol. Use the NWCONFIG.NLM utility to reinstall the Tivoli Storage Manager code on the NetWare server. Reconfigure the communications protocol so that the Tivoli Storage Manager client can communicate with the Tivoli Storage Manager server.
5. Load the necessary SMS target service agents. At the target NetWare server console enter:

   ```
   load tsands
   load tsa500 (NetWare 5)  or
   load tsa600 (NetWare 6)
   ```

6. Restore the entire NDS tree from Tivoli Storage Manager. Use the following command at the NetWare server console:

   ```
   load dsmc restore nds -replace=yes
   ```

   The ***-replace=yes*** option ensures that place-holders created by the restore process are properly replaced by real NDS objects.
7. Restore the volume(s) using Tivoli Storage Manager. Use the following NetWare console command for each volume you want to restore:

   ```
   load dsmc restore sys:\* -subdir=yes -replace=all -volinfo
   ```

   Where `SYS:` is the name of the failed volume.
8. Verify restoration of the NDS, file data, and trustee data.

Print Queues

Backup and Recovery of Print Queues

This section discusses how the backup and recovery procedures relate to print queues, i.e., the physical directories and files relating to the NetWare printing environment. The objects relating to the printing environment (i.e., printer, print queue, and print server objects) which are stored in the NDS are backed up and restored as part of the NDS backup and restore procedures in this chapter.

Print Queue: File and Directory Entries

The Print Queue: The print queue proper is a directory entry where network print jobs reside until the actual printing. This directory is named by the object id and has a `.QDR` extension. The directory entries are located in the `\QUEUES` directory on a volume chosen by the administrator:

```
DATA:\QUEUES\05000005.QDR
```

The directory entries for the print queues are not recreated when you restore the NDS. Therefore, the directory entries must be restored from backup.

Hidden Print Queue Files: There are two file types which are created in the print queue directories which are hidden, system files: a print server ID file and system print information file.

The print server ID file has a `.SRV` extension and contains the IDs of print servers that are currently attached:

```
DATA:\QUEUES\05000004.QDR\Q_0005.SYS
```

The system print information file has a `.SYS` extension and contains print job information and links to the current print job files:

```
DATA:\QUEUES\05000004.QDR\Q_0005.SYS
```

These files are always opened with an access of **Deny Read/Deny Write** while the print server is active, and therefore cannot be processed by Tivoli Storage Manager. These files will be recreated after a restore when the print server driver (e.g., PSERVER.NLM) is loaded. We recommend that you exclude these files from Tivoli Storage Manager processing.

Queued Print Jobs: Network print jobs which are queued to printers exists as files in the print queue directories with a `.Q` extension:

```
DATA:\QUEUES\05000004.QDR\00050001.Q
```

Print jobs which are actively being printed (i.e., status=Active) are opened with an access of **Deny Read/Deny Write** and therefore cannot be processed by Tivoli Storage Manager. Print jobs which are queued to be printed (i.e., status=Ready) have no special attributes and can be processed by Tivoli Storage Manager as normal files.

Individual administrators must decide whether to backup queued print jobs. Since these files are temporary and can be quite large, we recommend that these files be excluded from Tivoli Storage Manager processing. After a restore, however, you must resubmit the print jobs if they are not processed by Tivoli Storage Manager.

Other Related File and Directory Entries: There are two other files related to the print queues which should be mentioned which are used by the print server to reference the printer and print queues: PRINT.id and QUEUE.id. These files reside in a directory entry under `\QUEUES` which correlates to the print server object id:

```
DATA:\QUEUES\05000004\PRINT.000
DATA:\QUEUES\05000004\QUEUE.000
```

These files can be processed normally by Tivoli Storage Manager and thus need no special consideration. These files do not appear to be used in the NetWare 4 and 5 environments, although they are present.

Include-Exclude Recommendations for Print Queues

We recommend that you back up the print queue directories but exclude the files contained in these directories since Tivoli Storage Manager cannot open them. To do this, you can specify the following ***exclude*** statement in your `dsm.opt` file:

```
EXCLUDE <vol>:\QUEUES\*.QDR\*
```

where `<vol>` is the volume on which the print queues reside.

If you want to process the actual queued print jobs, you can include these by specifying the following ***include*** statement in your `dsm.opt` file:

```
INLCUDE <vol>:\QUEUES\*.QDR\*.Q
```

Note: Do not use the ***exclude.dir*** statement to exclude the print queue directories because this will exclude the directory entries from processing.

Print Queue Restore Procedures

Local Print Servers - PSERVER.NLM: If the print server drivers reside locally on the NetWare server (i.e., PSERVER.NLM), there are no explicit steps to restore the print environment if you use the include-exclude recommendations in "Include-Exclude Recommendations for Print Queues". You can restore the print environment using the restore procedures in this chapter:

- Restoring the NDS will restore the printer, print server, and print queue objects.
- Restoring the NetWare volumes will restore the proper directory entries.
- Loading PSERVER.NLM (usually in autoexec.ncf) will ensure the creation of the proper files in the print server directories.

Network Print Servers: Network cards (e.g., HP's JetDirect) can provide print server services which attach directly to the network. In such environments, PSERVER.NLM is not used and special explicit considerations must be made to recreate the necessary `.SRV` and `.SYS` files in the print queue directories. To explicitely create these files after all other restore procedures have been accomplished, use the following steps:

1. Execute the `PCONSOLE.EXE` utility.
2. Select *Print Queues* from the *Available Options* menu.

   Note: Repeat this step for each print queue.
3. Select the individual print queue from the *Print Queues* menu. This creates the `.SRV` and `.SYS` files in the print queue directory.

After this step, the print queue is fully functional. This procedure has been verified in a JetDirect environment to correctly create the files necessary to make the print queues functional after a restore.

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Glossary

Term definitions in this glossary pertain to the Tivoli Storage Manager library. If you do not find a term you are looking for, you can refer to the following publications:

- *IBM Dictionary of Computing*, at URL:

  `http://www.ibm.com/networking/nsg/nsgmain.htm`
- *Tivoli Software Glossary*, at URL:

  `http://www.tivoli.com/support/documents/glossary/termsm03.htm`

This glossary may include terms and definitions from:

- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright (ANSI). You can purchase copies from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036.
- The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC2/SC1).

A

absolute. A copy group mode value that indicates a file is considered for incremental backup even though the file has not changed since the last time it was backed up. See *mode*. Contrast with *modified*.

access control list (ACL).

1. In computer security, a collection of all access rights for one object.
2. In computer security, a list associated with an object that identifies all the subjects that can access the object and their access rights; for example, a list associated with a file that identifies users who can access the file and identifies their access rights to that file.

ACL. access control list

active policy set. The policy set within a policy domain that contains the most recently activated policy. All client nodes assigned to the current policy domain use this policy set. See *policy set*.

active version. The most recent backup copy of a file stored in Tivoli Storage Manager storage for a file that currently exists on a file server or workstation. An active version remains active and exempt from deletion until:

- Replaced by a new backup version.
- Tivoli Storage Manager detects, during an incremental backup, that the user has deleted the original file from a file server or workstation.

administrative client. A program that runs on a file server, workstation, or mainframe. This program lets administrators monitor and control Tivoli Storage Manager servers using administrator commands. Contrast with *backup-archive client*.

administrator. A user who is registered to the server as an administrator. Administrators may possess one or more privilege classes. Administrators can use the administrative client to enter Tivoli Storage Manager server commands and queries according to their privileges.

aggregate data transfer rate. Dividing the total number of bytes transferred by the elapsed processing time calculates the data transfer rate.

archive. A function permitting users to copy one or more files to a long-term storage device. Archive copies can:

- Carry associated descriptive information
- Be compressed to minimize storage requirements
- Be retrieved by archive date, file name, or description

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Contrast with *retrieve*.

archive copy. A file or group of files residing in an archive storage pool in Tivoli Storage Manager storage.

archive copy group. A policy object containing attributes that control the generation, destination, and expiration of archived files. The archive copy group belongs to a management class.

archive retention grace period. The number of days Tivoli Storage Manager retains an archived copy when the server is unable to rebind the file to an appropriate management class.

authentication. The process of checking and authorizing a user's password before permitting user access to the Tivoli Storage Manager server. An administrator with system privilege can enable or disable authentication.

authorization rule. A specification permitting another user to either restore or retrieve a user's files from Tivoli Storage Manager storage.

B

backup. A function permitting users to copy one or more files to a storage pool to protect against data loss. Contrast with *restore*.

backup-archive client. A program that runs on a file server, PC, or workstation and provides a means for users to back up, archive, restore, and retrieve files. Contrast with *administrative client*.

backup copy group. A policy object that contains attributes controlling the generation, destination, and expiration of backup files. The backup copy group belongs to a management class.

backup retention grace period. The number of days Tivoli Storage Manager retains a backup version when the server is unable to rebind the file to an appropriate management class.

backup set. A collection of active files in your file spaces that reside on the Tivoli Storage Manager server. The Tivoli Storage Manager administrator creates the backup set and copies it onto portable media device that is supported by the Tivoli Storage Manager server and client.

backup version. A backed up file, directory, or file space that resides in a backup storage pool in Tivoli Storage Manager storage. The *active* version is the most recent backup version. See *active version* and *inactive version*.

bindery. A database that consists of three system files for a NetWare 3.11, 3.12 server. The files contain user IDs and user restrictions.

binding. The process of associating a file with a management class name.

boot. To prepare a computer system for operation by loading an operating system.

C

central scheduling. A function permitting an administrator to schedule backup and archive operations from a central location. Schedule operations on a periodic basis or on an explicit date.

client. A program running on a file server, PC, workstation, or terminal that requests services of another program called the server. There are two types of Tivoli Storage Manager clients: administrative and backup-archive. See *administrative client* and *backup-archive client*.

client domain. The set of drives, file systems, or volumes selected by a user for processing during a backup or archive operation.

client node. A file server or workstation registered with the server on which the backup-archive client program is installed.

client polling. A client and server communication technique where the client node queries the server for scheduled work.

client/server. A communications network architecture in which one or more programs (clients) request computing or data services from another program (the server).

closed registration. A registration process in which a Tivoli Storage Manager administrator must register workstations as client nodes with the server. Contrast with *open registration*.

command line interface. A type of user interface where commands are specified on the command line. Contrast with *graphical user interface*.

communication method. The method by which a client and server exchange information. For Tivoli Storage Manager backup-archive clients, the method can be TCP/IP. See *Transmission Control Protocol/Internet Protocol*.

communication protocol. A set of defined interfaces that permits computers to communicate with each other.

copy group. A policy object that contains attributes that control backup and archive file:
- Generation
- Destination
- Expiration.

Backup and archive copy groups belong to management classes. See *frequency*, *destination*, *mode*, *retention*, *serialization*, and *version*.

D

default management class. A management class assigned to a policy set. This class is used to govern backed up or archived files when a user does not explicitly associate a file with a specific management class through the include-exclude list.

destination. A copy group attribute that specifies the storage pool in which to back up or archive a file. At installation, Tivoli Storage Manager provides two storage destinations named **backuppool** and **archivepool**.

domain. See *policy domain* or *client domain*.

drag. Move the mouse while holding down the mouse button, thus moving the selected object.

drag-and-drop. Move (drag) an object on top of another object and release the mouse button, thus relocating the object.

dsm.opt file. See *options file*. . Also called client options file.

dynamic. A copy group serialization value that specifies Tivoli Storage Manager accept the first attempt to back up or archive an object, regardless of any changes made during backup or archive processing. See *serialization*. Contrast with *shared dynamic*, *shared static*, and *static*.

E

error log. A text file written on disk that contains Tivoli Storage Manager processing error messages. The Tivoli Storage Manager server detects and saves these errors.

exclude. To identify files in an include-exclude list that you do not want to include in a specific client operation, such as backup or archive.

exabyte (EB). (1) For processor storage, real and virtual storage, and channel volume, 1,152,921,504,606,846,976 bytes. (2) For disk storage capacity and communications volume, 1,000,000,000,000,000,000 bytes.

expiration. The process in which files are identified for deletion because their expiration date or retention period is passed. Backups or archives are marked for deletion based on the criteria defined in the backup or archive copy group.

expiring file. A migrated or premigrated file that is marked for expiration and removal from Tivoli Storage Manager storage. If a stub file or an original copy of a premigrated file is deleted from a local file system, or if the original copy of a premigrated file is updated, the corresponding migrated or premigrated file is marked for

expiration the next time reconciliation is run. It expires and is removed from Tivoli Storage Manager storage after the number of days specified with the ***migfileexpiration*** option have elapsed.

F

file server. A dedicated computer and its peripheral storage devices connected to a local area network that stores both programs and files shared by users on the network.

file space. A logical space on the Tivoli Storage Manager server that contains a group of files. In Tivoli Storage Manager, users can restore, retrieve, or delete file spaces from Tivoli Storage Manager storage. A file space for systems:

- **Windows**— file spaces for removable media are identified by volume label. Fixed drive file spaces are identified by Universal Naming Convention (UNC) name.
- **UNIX** — Logical space that contains a group of files backed up or archived from the same file system, or part of a file system defined with the virtualmountpoint option in the client system options file.

frequency. A copy group attribute that specifies the minimum interval, in days, between incremental backups.

fuzzy backup. A backup version of a file that might not accurately reflect what is currently in the file because the file was backed up at the same time as it was being modified.

fuzzy copy. An archive copy of a file that might not accurately reflect what is currently in the file because Tivoli Storage Manager archived the file while the file was being modified.

G

generate password. Processing that stores a new password in an encrypted password file when the old password expires. Automatic generation of a password prevents password prompting. Password generation can be set in the options file (passwordaccess option). See *options file.*

gigabyte (GB). (1) One billion (10^9) bytes. (2) When referring to memory capacity, 1 073 741 824 in decimal notation.

graphical user interface (GUI). A graphical user interface offers pictoral rather than text-based access to a computer. A graphical user interface includes:

- A combination of graphics and icons
- Use of a mouse or pointing device
- Menu bars, dropdown lists, and overlapping windows

Contrast with *command line interface*. See *windowed interface*.

GUI. Graphical user interface.

H

hierarchical storage management client. A program that runs on a workstation or file server to provide space management services. The hierarchical storage management client automatically migrates eligible files to Tivoli Storage Manager storage to maintain specific levels of free space on local file systems. Automatic recalls are made for migrated files when they are accessed. Users are also permitted to migrate and recall specific files.

HSM. Hierarchical Storage Management.

I

inactive version. A copy of a backup file in Tivoli Storage Manager storage that either is not the most recent version, or the corresponding original file was deleted from the client file system. Inactive backup versions are eligible for expiration according to the management class assigned to the file.

include-exclude file. A file containing statements to determine the files to back up and the associated management classes to use for backup or archive. See *include-exclude list*.

include-exclude list. A list of include and exclude options that include or exclude selected files for backup. An exclude option identifies files that should not be backed up. An include option identifies files that are exempt from the exclusion rules or assigns a management class to a file or a group of files for backup or archive services. The include-exclude list is defined in one or more include-exclude files or in the client options file. The include-exclude list may contain entries from any or all of the following sources: the client options file (Windows), the client system options file (Unix), separate include-exclude files, or the Tivoli Storage Manager server. See *options file*.

incremental backup. A function that permits user to back up new or changed files or directories from a client domain or from specified directories or files. These directories or files are not excluded in the include-exclude list and meet the requirements for frequency, mode, and serialization as defined by a backup copy group of the management class assigned to each file. Contrast with *selective backup*.

IPL. Initial Program Load. See *boot* and *reboot*.

L

LAN. Local area network.

Local Area Network (LAN). A variable-sized communications network placed in one location. LAN connects servers, PCs, workstations, a network operating system, access methods, and communications software and links.

logical unit number (LUN). A logical unit number (LUN) is a unique identifier used on a SCSI bus that enables it to differentiate between up to eight separate devices (each of which is a logical unit). Each LUN is a unique number that identifies a specific logical unit, which may be a hard disk, tape drive, or other device which understands the SCSI protocol.

M

management class. A policy object that is a named collection of copy groups. A management class is associated with a file to specify how the server should manage backup versions or archive copies of workstation files. See *binding* and *copy group*.

mode. A copy group attribute that specifies whether a backup file should be created for a file that was not modified since the last time the file was backed up. See *absolute* and *modified*.

modified. A backup copy group attribute indicating a file is considered for backup only if the file has been changed since the last backup. A file is considered changed if the date, size, owner, or permissions have changed. See *absolute* and *mode*.

N

NDS. NetWare Directory Services.

NetWare Directory Services (NDS). A database used by Novell NetWare to organize resources for an entire network of NetWare servers. The database itself can be distributed across the network and accessed by all servers. The NDS is available in NetWare Version 4.0 and later versions.

NetWare Loadable Module (NLM). Novell NetWare software that provides extended server capability. Support for various Tivoli Storage Manager and NetWare platforms are examples of NLMs.

network data transfer rate. The data transfer rate calculated by dividing the total number of bytes transferred by the data transfer time. For example, the time spent transferring data over the network.

NLM. NetWare Loadable Module.

node. See *client node*.

node name. A unique name used to identify a workstation, file server, or PC to the server.

O

open registration. A registration process in which users can register their own workstations or PCs as client nodes with the server. Contrast with *closed registration*.

options file. A file that contains processing options.

- **dsm.opt**

  Non-UNIX — Identifies Tivoli Storage Manager servers, specifies communication methods, defines scheduling options, selects backup, archive, restore, and retrieve options. Also called the client options file.

  UNIX — Identifies the Tivoli Storage Manager server to contact, specifies backup, archive, restore, and retrieve options. Also called the client users options file.
- **dsm.sys**

  UNIX — Contains stanzas describing Tivoli Storage Manager servers to contact for services. These stanzas also specify communication methods, backup and archive options, and select scheduling options. Also called the client system options file.
- **TSM User Preferences file** For the Macintosh client only: Identifies Tivoli Storage Manager servers, specifies communication methods, defines scheduling options, selects backup, archive, restore, and retrieve options. Also called the client options file.
- **TSM System Preferences file** For the Macintosh client only: Contains stanzas describing Tivoli Storage Manager servers to contact for services. These stanzas also specify communication methods, backup and archive options, and select scheduling options.

owner. The owner of backup-archive files sent from a multi-user client node, such as AIX.

P

pattern-matching character. See *wildcard character*.

plug-in. A self-contained software component that modifies (adds or changes) function in a particular software system. When you add a plug-in to a software system, the foundation of the original software system remains intact.

policy domain. A policy object that contains one or more policy sets. Client nodes are associated with a policy domain. See *policy set*, *management class*, and *copy group*.

policy set. A policy object that contains a group of management class definitions that exist for a policy domain. At any one time, there can be many policy sets within a policy domain, but only one policy set can be active. See *active policy set* and *management class*.

progress indicator. A control used to inform a user about the progress of a process.

R

reboot. To restart the operating system.

registration. The process of identifying a client node or administrator to the server by specifying a user ID, password, and contact information. For client nodes, a policy domain, compression status, and deletion privileges are also specified.

restore. A function that permits users to copy a version of a backup file from the storage pool to a workstation or file server. The backup copy in the storage pool is not affected. Contrast with *backup*.

retention. The amount of time, in days, that inactive backed up or archived files are retained in the storage pool before they are deleted. The following copy group attributes define retention: retain extra versions, retain only version, retain version.

retrieve. A function permitting users to copy an archived file from the storage pool to the workstation or file server. The archive copy in the storage pool is not affected. Contrast with *archive*.

S

scheduling mode. The type of scheduling operation for the client-server node. Tivoli Storage Manager supports two scheduling modes: client-polling and server-prompted.

scroll. Move through a list of items in a window by operating the scrollbars with the mouse cursor.

select. Choose an item from a list or group of items.

selective backup. A function permitting users to back up specified files. These files are not excluded in the include-exclude list and meet the requirement for serialization in the backup copy group of the management class assigned to each file. Contrast with *incremental backup*.

serialization. A copy group attribute that specifies whether a file can be modified during a backup or archive operation. See *static*, *dynamic*, *shared static*, and *shared dynamic*.

server. A program running on a mainframe, workstation, or file server that provides shared services such as backup and archive to other various (often remote) programs (called clients).

server-prompted scheduling. A client-server communication technique where the server contacts the client node when tasks need to be done.

session. A period of time in which a user can communicate with a server to perform backup, archive, restore, or retrieve requests.

shared dynamic. A Tivoli Storage Manager copy group serialization mode. This mode specifies if a file changes during backup or archive and continues to change after a number of retries. The last retry commits the file to the Tivoli Storage Manager server whether or not the file changed during backup or archive. Contrast with *dynamic*, *shared static*, and *static*.

shared static. A copy group serialization value specifying that a file must not be modified during a backup or archive operation. Tivoli Storage Manager attempts to retry the operation a number of times. If the file is in use during each attempt, the file is not backed up or archived. See *serialization*. Contrast with *dynamic*, *shared dynamic*, and *static*.

share point. A drive or directory on Windows NT, 2000, Me, XP, or Windows.Net whose files are available for shared access across a network. The share point name is part of a UNC name. See *Universal Naming Convention (UNC)* name.

shift-click. Click on an item while pressing the Shift key.

space management. The process of keeping sufficient free storage space available on a local file system for new data and making the most efficient and economical use of distributed storage resources.

snapshot. An image backup type. A snapshot is a point-in-time view of a volume. When you perform an online image backup, the Logical Volume Snapshot Agent (LVSA) takes a snapshot of the volume. Any changes that occur to the volume after the snapshot begins are not included in the backup.

stabilized file space. A file space that exists on the server but not on the client. This situation can arise in at least two instances:
1. A drive is removed from a client workstation
2. A file space is renamed on the server

Stabilized file spaces remain on the server until deleted by the user or administrator. Files and directories can be restored and retrieved from a stabilized file space. However, it is not possible to back up or archive data to a stabilized file space.

static. A copy group serialization value specifying that a file must not be modified during a backup or archive operation. If the file is in use during the first attempt, Tivoli Storage Manager will not back up or archive the file. See *serialization*. Contrast with *dynamic*, *shared dynamic*, and *shared static*.

storage pool. A named set of storage volumes used as the destination of backup, archive, or migrated copies.

system drive or partition. On Windows NT, the drive or partition on which Windows NT is installed.

T

TCA. Trusted Communications Agent

TCP/IP. Transmission Control Protocol/Internet Protocol.

timeout. A time event involving:
- An event that happens at the end of a predetermined period of time that began at the happening of another specified event.
- A time interval allotted for certain operations to happen. For example, response to polling or addressing before system operation is interrupted and must be restarted.
- A terminal feature that logs off a user if an entry is not made within a specified period of time.

Tivoli Storage Manager. A client-server licensed program product that provides storage management and data access services to customers in a multivendor computer environment.

Transmission Control Protocol/Internet Protocol (TCP/IP). A standard set of communication protocols that supports peer-to-peer connectivity of functions for both local and wide-area networks.

Trusted Communications Agent (TCA) (UNIX). A program that can handle the sign-on password protocol when password access is generated. The main process (for example, ***dsm***, ***dsmc***) makes a run time decision based on the password access option setting, the user ID, and the executables' access privileges to run this program. The file that contains this program must have the 's' bit set in its mode field and the owner must be root.

V

version. Storage management policy may allow back-level copies of backed up objects to be kept at the server whenever an object is newly backed up. The most recent backed up copy is called the ″active″ version. Earlier copies are ″inactive″ versions. The following backup copy group attributes define version criteria: versions data exists, and versions data deleted.

W

wildcard character. An asterisk (*) or question mark (?) character used to represent multiple (*) or single (?) characters when searching for various combinations of characters in alphanumeric and symbolic names.

windowed interface. A type of user interface that is either a graphical user interface or a text-based interface. The text-based interface maintains a close affinity to the graphical user interface, including action bars and their associated pull-down menus and windows. See *graphical user interface*.

workstation. A programmable high-level workstation (usually on a network) with its own processing hardware such as a high-performance personal computer. In a local area network, a personal computer that acts as a single user or client. A workstation can also be used as a server.

world wide name. A unique 48 or 64 bit number assigned by a recognized naming authority (often via block assignment to a manufacturer) that identifies a connection or a set of connections to the network. Abbreviated WWN. A WWN is assigned for the life of a connection (device). Most networking technologies (e.g., Ethernet, FDDI, etc.) use a world wide name convention.

Index

A

absolute mode 63
access
  deleting 189
  for other nodes 47
  querying 200
active files
  displaying 24, 202
active version 45
  defined 42
archive
  allocated memory required for processing
    UNIX restrictions 31
  binding management classes to files 66
  command 187
  copy mode 63
  deleting 190
  grace period retention 60
  how managed 59
  maximum file size 185
  overriding managment class during 65
  purpose 28
  sorting file list 24
  using the Web client 20
  using Web client GUI 50
archive copy group 60
  attributes 60
archived files
  advanced considerations 51
  archive command, using 49
  deleting archived files 51
  display 201
  overview 49
  summary of options 70
archmc option 153
authorization
  summary of options 74
authorization rule
  deleting 189
  querying 200
authorized user
  definition xi
autoexec.ncf file, updating 5
automating backup-archive services
  central scheduling 53
  using client scheduler 53

B

backing up
  incremental backup processing 29
  summary of options 70
backing up files
  active version 42, 45
  full incremental backup 35
  inactive version 42, 45
backing up files *(continued)*
  include-exclude list 35
  open file 38
  partial incremental backup 36
  related topics 40
  restore 41
  selective backup 40
    command 36
backup
  allocated memory required for processing
    UNIX restrictions 31
  binding management classes to files 66
  copy mode 63
  displaying processing status 36
  files with long names 28
  files, management class 64
  full incremental
    using Web client GUI 37
  fuzzy 63
  grace period retention 60
  inactivate a list of files 192
  incremental
    restrictions for directories 30
  incremental backup by date
    using Web client GUI 37
  incremental-by-date 31
    restrictions for directories 31
  managing 59
  maximum file size 185
  new and changed files 29
  new or changed files 28
  overview 28
  performance comparison between incremental and incremental-by-date 31
  purpose 28
  saving encryption key password 90
  selective 31
    using Web client GUI 37
  sorting file list 24
  using multiple sessions 36
  using the Web client 20
backup copy group 60
  attributes 60
backup set
  enabling GUI for local restore 46
  restore 46
backup-archive client
  overview 1
batch mode 182
  starting a session 18
bottom up processing
  include-exclude list 12

C

cancel restore command 188
central scheduling
  summary of options 72
changingretries option 78
client
  registering with server 7
  setting password 7
client acceptor daemon
  use to manage scheduler 102
  use to manage scheduler and Web client 102
  use to manage Web client 102
client command options 183
  archmc 153
  deletefiles 154
  description 155
  detail 156
  dirsonly 157
  filelist 158
  filesonly 160
  fromdate 161
  fromnode 162
  fromtime 163
  ifnewer 164
  inactive 165
  incrbydate 166
  latest 167
  noprompt 169
  overriding the client options file 149
  pick 171
  pittime 173
  preservepath 174
  todate 177
  totime 178
  using options with commands 149
  v2archive 179
  volinformation 180
client commands
  overriding client options file 75
client components
  NetWare client 2
client message language type 100
client options 183
  changingretries 78
  commmethod 79
  commrestartduration 80
  commrestartinterval 81
  compressalways 82
  compression 83
  dateformat 85
  dirmc 86
  domain 87
  editor 89
  errorlogname 91
  errorlogretention 92
  exclude
    exclude.archive 8, 93
    exclude.backup 8, 93
    exclude.compression 8, 93
    exclude.dir 8, 93
    exclude.encrypt 93
    exclude.file 8, 93
    exclude.file.backup 8, 93
  httpport 96

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client options *(continued)*
inclexcl 97
include 98
include.archive 98
include.backup 98
include.compression 98
include.encrypt 98
include.file 98
language 100
largecommbuffers 101
location 168
managedservices 102
maxcmdretries 104
memoryefficientbackup 105
nodename 106
numberformat 107
nwignorecompressbit 108
nwpwfile 109
nwuser 110
nwwaitonerror 112
optfile 170
overriding using command line 75
password 113
passwordaccess 114
passworddir 116
pitdate 172
postnschedulecmd 117
postschedulecmd 117
prenschedulecmd 118
preschedulecmd 118
processorutilization 119
queryschedperiod 120
quiet 121
replace 122
resourceutilization 123
retryperiod 125
revokeremoteaccess 126
schedcmddisabled 127
schedlogname 128
schedlogretention 129
schedmode 130
scrolllines 132
scrollprompt 133
setting in a file 6
subdir 134
tapeprompt 136
tcpbuffsize 137
tcpclientaddress 138
tcpclientport 139
tcpport 140
tcpserveraddress 141
tcpwindowsize 142
timeformat 143
txnbytelimit 144
using with commands 75
verbose 145
virtualnodename 146
webports 147
client options file
creating and modifying 5
required options for 5
specifying include-exclude options 8
client scheduler
connecting to server schedule 55
displaying completed work 56
displaying scheduled work 55
scheduled command 55
client scheduler *(continued)*
starting 55, 220
client system options
httpport 96
schedmode 130
scrolllines 132
client-server communications
establishing 5
closed registration
permissions 7
using 7
command line
displaying processing status 36
ending a session 25
overriding managment class during archive 65
starting a session 18
command line interface
return codes from 53
command name 183
command parameters
optional 184
required 184
command processing, summary of options 73
command rules 186
commands
archive 187
batch mode 182
cancel restore 188
delete access 189
delete archive 190
delete filespace 191
expire 192
help 193
incremental 194
interactive (loop) mode 183
loop 198
macro 199
number of files specifications permitted 184
query access 200
query archive 201
query backup 202
query backupset 203
query filespace 204
query inclexcl 205
query mgmtclass 206
query restore 207
query schedule 208
query session 209
query TSA 210
recall previous 185
restart restore 213
restore 214
restore backupset 216
retrieve 218
schedule 220
scheduled, enabling or disabling 57
selective 221
set access 223
set password 225
using in executables 53
using options with 75
commmethod option 79
commrestartduration option 80
commrestartinterval option 81
communication methods
summary 69
TCP/IP
NetWare client 2
V4.2 changes 1
communications
establishing through firewall 23
compressalways option 82
compression option 83
compression processing 83, 93, 98
configuring Tivoli Storage Manager
optional tasks 5
required tasks 5
connections, number 24
copy destination attribute 63
copy frequency attribute 61
copy group name attribute 61
copy groups 59
archive 60
backup 60
copy mode attribute
absolute 63
modified 63
copy serialization attribute 62
copy type attribute 61

D

dateformat option 85
default
management class 59
policy domain 59
delete
access command 189
deletefiles option 154
deleting
archived files 51
file spaces 48
description option 155
detail option 156
directories
restrictions on excluding from incremental backup 29
restrictions on excluding from selective backup 40
restrictions on processing during incremental backup 30
restrictions on processing during incremental-by-date 31
directory
archive using Web client 50
management classes 86
retrieve using Web client 52
specifying 184
dirmc option 86
dirsonly option 157
disaster recovery 48
disk
restore 48
disk space requirements
NetWare client 2
displaying
active backup versions 24
archived files 201
backed up files 202
file details 38
inactive backup versions 24

displaying *(continued)*
inactive backups 45
messages 145
messages, stopping 121
online help 25
restartable restore sessions 207
scheduled events 208
session information 209
TSA information 210
domain option 87
dsm.opt file
creating and modiying 5
required options for 5
dsm.smp file
copying to dsm.opt 5
location 5
dsmsched.log file 56
dynamic and shared serialization 62

E

editor option 89
encrypting file data 27
encryption
excluding files 93
saving encryption key password 90
encryptkey 27
encryptkey option 90
ending a command line session 25
entering client commands 183
entering commands 186
environment prerequisites
NetWare client 2
error log
pruning 92
error processing, summary of options 74
errorlogname option 91
errorlogretention option 92
exclude option
exclude.archive 8
exclude.backup 8
exclude.compression 8
exclude.dir 8
exclude.file 8
exclude.file.backup 8
processing 12
to exclude system files 10
wildcard characters 10, 12
exclude options
exclude.archive 93
exclude.backup 93
exclude.compression 93
exclude.dir 93
exclude.encrypt 93
exclude.file 93
exclude.file.backup 93
exclude.encrypt 93
excluding files
system files 10
using wildcard characters 12
wildcard characters 10
executables
return codes from 53
expire command 192

F

file
archive using Web client 50
details, displaying 38, 51
retrieve using Web client 52
file space
delete 191
file spaces
deleting 48
file specification
number permitted on commands 184
file specification syntax
maximum file specifications in command 184
specifying 184
filelist option 158
files
archived, overriding management class 65
archiving 187
backing up changed 28
backing up long names 28
backing up new 28
backing up when open 38
binding management classes to 66
definition of changed 29
delete archived 51
encryption 27
excluding groups 10, 12
how managed 40
including groups 10, 12
maximum file size for operations 185
processing include-exclude 12
restoring
another node's 47
to another NetWare server 47
retrieve 51
retrieving
another node's 47
archived files 51
to another NetWare server 47
sorting list 24
filesonly option 160
firewall
establishing communications through 23, 96, 140
specifying TCP/IP ports for the Web client 147
using Web client through 147
format and language
summary of options 73
fromdate option 161
fromnode option 47, 162
fromtime option 163
full incremental
comparing performance with incremental-by-date 31
description 29
overview 28
when to use 31
fuzzy backup 63

G

graphical user interface
displaying processing status 36
graphical user interface *(continued)*
enabling local backup set 46
GUI
overriding managment class during archive 65

H

hardware requirements
NetWare client 2
help
displaying online 25
online forum 25
service and technical support 25
help command 193
httpport option 96

I

IBM Tivoli Storage Manager
introducing 1
id
saving a NetWare 19
ifnewer option 164
inactive files
displaying 24, 202
inactive option 165
inactive version 45
defined 42
inclexcl option 97
include option
management class 64
processing 12
wildcard characters 10, 12
include options
include 98
include.archive 98
include.backup 98
include.compression 98
include.encrypt 98
include.file 98
include-exclude list
backup, used during 35
creating 8
query order of processing 205
include-exclude options file
specifying path and file name of 97
Unicode-enabled file spaces 97
incrbydate option 166
incremental backup
by date 36
description 29
full 35
new and changed files 29
of directories
restrictions 30
overview 28
process 29
types 28
using Web client GUI 37
incremental by date
using Web client GUI 37
incremental command 194
incremental-by-date
comparing performance with incremental 31

incremental-by-date *(continued)*
description 31
of directories
restrictions 31
when to use 31
installation requirements
NetWare client 2
installing Tivoli Storage Manager
overview 3
interactive mode 183
interactive session
ending 198
starting 19, 198
using 198

L

language option 100
largecommbuffers option 101
latest option 167
local backup set
enabling GUI for local restore 46
location option 168
log
pruning error 92
long names
affecting include/exclude statements 34
backing up files with 28
converted to Macintosh name space 34
migration to 32
problems converting from short names 34
restoring to volume without long name space 34
running backup before converting 34
support for 32
with embedded blanks 34
loop command 198

M

Macintosh name space
non-support 32
macro command 199
managedservices option 102
management classes
assigning to directories 65, 86
assigning to files 64
backup 40
binding to files 66
default 59
displaying 60
displaying information about 206
overriding during archive processing 65
overriding the default 64
processing 64
questions to consider 63
selecting for files 63
selecting for NDS and bindery 65
specifying with include option 64
using management class, example 64
maxcmdretries option 104
memory
required for client processing
UNIX restrictions 31
memory requirements
NetWare client 2
memoryefficientbackup option 105
messages
displaying on screen 145
stop displaying 121
migrating from earlier versions of the product 1
modes
batch 182
interactive (loop) 183
modified mode 63
multiple sessions
backup objects, using 36

N

name space
migration to long 32
NAS
deleting file spaces 191
NetWare client
accessing remote NetWare servers 15
client components 2
communication methods 2
hardware requirements 2
operating system requirements 2
storage management services 2
updating autoexec.ncf file 5
NetWare server
connections, number 24
Network Attached Storage (NAS) file server
deleting file spaces 191
display file spaces on server 204
Querying file system images belonging to 202
no query restore 41
node name 5
node option, summary 70
nodename option 47, 106
noprompt option 169
numberformat option 107
nwignorecompressbit option 108
nwpwfile option 39, 109
nwuser option 39, 110
nwwaitonerror option 112

O

online books, installing
NetWare 3
online help
displaying 25
online forum 25
service and technical support 25
online Help forum 25
open file, backing up 38
open registration
permissions 7
using 7
operating system requirements
NetWare client 2
optfile option 170
optional parameters 184
options
archive, summary 70
archmc 153
authorization, summary 74
backup, summary 70
central scheduling, summary 72
changingretries 78
command processing, summary 73
commmethod 79
commrestartduration 80
commrestartinterval 81
communication, summary 69
compressalways 82
compression 83
dateformat 85
deletefiles 154
description 155
detail 156
dirmc 86
dirsonly 157
domain 87
editor 89
encryptkey 90
errorlogname 91
errorlogretention 92
exclude
exclude.archive 8, 93
exclude.backup 8, 93
exclude.compression 8, 93
exclude.dir 8, 93
exclude.encrypt 93
exclude.file 8, 93
exclude.file.backup 8, 93
wildcard characters 10, 12
filelist 158
filesonly 160
format and language, summary 73
fromdate 161
fromnode 162
fromtime 163
httpport 96
ifnewer 164
inactive 165
inclexcl 97
include 98
management class, specifying 64
wildcard characters 10, 12
include.archive 98
include.backup 98
include.compression 98
include.encrypt 98
include.file 98
incrbydate 166
language 100
largecommbuffers 101
latest 167
location 168
managedservices 102
maxcmdretries 104
memoryefficientbackup 105
nodename 106
noprompt 169
numberformat 107
nwignorecompressbit 108
nwpwfile 109

options *(continued)*
nwuser 110
nwwaitonerror 112
optfile 170
overriding the client options file 149
password 113
passwordaccess 114
passworddir 116
pick 171
pitdate 172
pittime 173
postnschedulecmd 117
postschedulecmd 117
prenschedulecmd 118
preschedulecmd 118
preservepath 174
processorutilization 119
queryschedperiod 120
quiet 121
replace 122
resourceutilization 123
restore and retrieve, summary 72
retryperiod 125
revokeremoteaccess 126
schedcmddisabled 127
schedlogname 128
schedlogretention 129
schedmode 130
scrolllines 132
scrollprompt 133
specifying in commands 75
subdir 134
tapeprompt 136
tcpbuffsize 137
tcpclientaddress 138
tcpclientport 139
tcpport 140
tcpserveraddress 141
tcpwindowsize 142
timeformat 143
todate 177
totime 178
transaction processing, summary 75
txnbytelimit 144
using options with commands 149
v2archive 179
verbose 145
virtualnodename 146
volinformation 180
Web client, summary 75
webports 147
overriding the client options file 149

P

parameters, command
optional 184
required 184
partial incremental
incremental by date, running 36
password
changing 225
saving a NetWare 19
setting for client 7
using 18
password option 113
passwordaccess option 114
passworddir option 116
performance
restore operations 43
transaction options 75
transaction processing 144
permissions
deleting 189
pick option 171
pitdate 172
pittime option 173
point-in-time 44
policies, storage management 59
policy domains
default policy domain 59
standard policy domain 59
policy sets
active policy set 59
portable media
restoring backup sets 46
postnschedulecmd options 117
postschedulecmd options 117
prenschedulecmd option 118
preschedulecmd option 118
preservepath option 174
processing options
authorization 74
backup and archive 70
central scheduling 72
communication 69
error processing 74
format and language 73
node option 70
restore and retrieve 72
setting 6
specifying in commands 75
transaction processing 75
Web client 75
processing transactions 144
processorutilization option 119
pruning
error log 92

Q

query
include-exclude list 205
query access command 200
query archive command 201
query backup command 202
query backupset command 203
query filespace command 204
query inclexcl command 205
query mgmtclass command 206
query restore command 207
query schedule command 208
query session command 209
query TSA command 210
queryschedperiod option 120
quiet option 121

R

rebinding files to a different management class 66
recall commands 185
registering
client with server 7
using closed registration 7
using open registration 7
remote NetWare servers, accessing 15
remote servers
requesting backup-archive services 39
replace option 122
required parameters 184
resourceutilization option 123
restart restore command 213
restartable restore 41
restartable restore sessions, display 207
restore
a disk 48
active version 45
backup sets
overview 46
supported tape devices 216
from portable media
overview 46
inactive version 45
large number of files 43
local backup set via GUI 46
maximum file size 185
multiple restore commands 43
no query 41
point-in-time restore 44
sorting file list 24
summary of options 72
using the Web client 20
restore backupset command 216
restore command 214
restoring files
active version 42
another node's files 47
authorizing another user 47
inactive version 42
NetWare server, to another 47
overview 41
related topics 46
retain extra versions attribute 62
retain only versions attribute 62
retain versions attribute 63
retention grace period
archive 60, 67
backup 60, 67
retrieve
maximum file size 185
sorting file list 24
summary of options 72
using the Web client 20
using Web client GUI 52
retrieve command 51, 218
retrieving files
another node's files 47
authorizing another user 47
NetWare server, to another 47
overview 51
retry
backup 78
retryperiod option 125
return codes 53
revokeremoteaccess option 126
rules 59

S

schedcmddisabled option 127
schedlogname option 128
schedlogretention option 129
schedmode option 130
schedule command 220
schedule log
  pruning 129
scheduled commands
  enabling-disabling 57
scheduled events, displaying 208
scheduled services 53
  disabling scheduled commands 127
  displaying completed work 56
  displaying scheduled work 55
  managed by client acceptor 55
  resolving memory retention after scheduled backups 55
  running 55
  scheduling options 53
  starting 55
scheduling options 53
scrolllines option 132
scrollprompt option 133
selective backup
  description 31
  overview 36
  process 40
  using Web client GUI 37
selective command 36, 221
serialization
  copy serialization
    dynamic 62
    shared static 62
    static 62
server
  establishing communications through firewall 23
  establishing communications with 5
  specifying TCP/IP port address for 140
servers
  backup-archive services for remote 39
service and technical support 25
session information, displaying 209
set access command 223
set password command 225
shared dynamic serialization 62, 78
shared static serialization 62, 78
show menu 45
sorting
  files 24
standard management class
  copy destination 63
  copy frequency 61
  copy group name 61
  copy mode
    absolute 63
    modified 63
  copy serialization 62
  copy type 61
  default values 60
  retain extra versions 62
  retain only version 62
  retain versions 63
standard management class *(continued)*
  versions data deleted
    active versions 62
    inactive versions 62
  versions data exists 61
standard policy domain 59
starting
  Web client 20
starting a session
  batch mode 18
  interactive mode 19
starting Tivoli Storage Manager
  automatically
    overview 3
static serialization 62
static, shared serialization 62
storage
  displaying files 201, 202
  displaying restartable restore sessions 207
storage management policies 59
  copy groups 59
  default management class 59
  include-exclude list 60
  management classes 59
  policy domains
    default 59
    standard 59
  policy sets
    active policy set 59
storage management services 2
subdir option 134
summary of changes for version 5.1 xvii
Swing-enabled browser
  necessary to run Web client 20

T

tapeprompt option 136
TCP/IP communication method
  options 70
tcpbuffsize option 137
tcpclientaddress option 138
tcpclientport option 139
tcpport option 140
tcpserveraddress option 141
tcpwindowsize option 142
timeformat option 143
Tivoli Storage Manager
  client components
    NetWare client 2
  communication methods
    NetWare client 2
  configuring 5
  establishing communications through firewall 96, 140
  hardware requirements
    NetWare client 2
  migrating from earlier versions 1
  password 18
  server publications 3
  software requirements
    NetWare client 2
  V4.2 client-server communication changes 1
todate option 177
totime option 178
transaction processing 144
  summary of options 75
TSA information, displaying 210
txnbytelimit option 144

U

UNIX
  restrictions
    memory required for client processing 31
using
  options with commands 149
using options
  client 183
  client command 183

V

v2archive option 179
verbose option 145
versions data
  deleted attribute 62
  exists attribute 61
virtualnodename option 146
volinformation option 180
volume
  restriction with Mac and DOS name spaces 32

W

Web client
  enable to run in a Swing-enabled browser 20
  establishing communications through firewall 23, 96
  specifying TCP/IP port address for 96
  starting 20
  summary of options 75
  supported browsers 20
  unsupported functions 38, 51
  using through a firewall 147
  using to archive data 50
  using to retrieve archived data 52
Web client GUI
  performing full incremental backup 37
  performing incremental-by- date backup 37
  performing selective backup 37
webports option 147
wildcard characters
  include or exclude groups of files 10
  to include or exclude groups of files 12
  using 186

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